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Dy Director (Data)
Forest Survey of India
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Forest Resources Survey of Jammu Region of J & K

(Udhampur, Jammu, Kathua & Rajouri Districts)

INVENTORY RESULTS

FOREST SURVEY OF INDIA
NORTHERN ZONE
SHIMLA
1985

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(Riyasi)

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P R E F A C E

It is well known that the forest resources of the country are decreasing whereas demands on them for woodbased industries, timber, fuel and fodder are increasing with increase in population and all-round developmental activities. Hence, optimum planning and management of this scarce resource are imperative and with this end in view it is necessary to carry out surveys periodically. Forest Survey of India has been carrying out survey of forest resources in the country with a view to monitor periodically (pereferably on a 10 year cycle) the changing situation of land and present the data to focus attention on critical aspects for rational planning and development by national/State level planning organisations.

This report presents the inventory results on "Jammu region", comprising of Udhampur, Kathua, Rajouri and Jammu districts of J & K State. Field inventory in this region was carried out from November1982 to June 1983.

The total geographical area covered under this survey is 14,009.81 km² of which only 29 percent (4,066.47 km²) was tree covered about two decades back shown by green wash on Survey of India topo maps. This is far less than 60% laid down in National Forest P licy for maintaining proper ecological balance in such a hilly area. The survey has revealed that during the last two decades or so, of the 4,066.47 km² tree covered area, 353.84 km² (8.70 percent) area got deforested/diverted for other uses like agriculture/habitation while an area of 140.45 km²(3.46 percent) got degraded into scrub barren land due to excessive population pressure. Thus, the existing forest covered area has been shrinking at the rate of about half percent annually.

Out of the remaining area of 3572.18 km² which is tree covered, an area of 3191.20 km² is accessible , while an area of 380.98 km² is inaccessible. O f the 3191.20 km² accessible tree covered area, 486.62 km² (15.25 percent) is under tree cover density of 70 percent and above, 1,494.47 km² (46.83 percent) under 30% to69% and remaining 1,210.11 km² (37.92 percent) is under tree cover density of 5% to 29%. It is alarming to report

Contents

that regeneration over 91.50 percent of accessible tree forest area is either absent or inadequate. This report also gives information on other aspects of forest resources inclduing area under various forest types in accessible tree forest area.

The survey has revealed that Fir, Spruce, Fir-spruce, Kail, Deodar, Chir, Mixed conifers, Hardwood mixed with conifers, Upland Hardwood and Miscellaneous forest found in the region contain an estimated number of 94.413, 240.796, 154.771, 147, 234.111, 128.795, 190.001, 250.697, 358.328, 134.367, 157.956 stems per hectare respectively while the volume in the above forest types is 293.399, 302.815, 330.574, 278.370, 370.007, 103.548, 325.532, 84.783, 116.267, 20.256 and 23.740 m^3 per hectare respectively. The accessible tree forest area has a total growing-stock of 59.327 million stems and 41.773 million m^3 volume.

The report has been compiled by Shri S.R.Mehta, Deputy Director, under the guidance of Shri S.C.Joshi, Joint Director Forest Survey of India, Northern Zone, Shimla. It is hoped that the report will be of help to the State Forest department and organisations engaged in rational planning and development of forest resources in the region.

6.2.81

(D.D.Misra) DIRECTOR
FOREST SURVEY OF INDIA
DEHRADUN

Contents

TABLE OF CONTENTS

		Page
	Location map of survey area	(i)
	Summary	(ii) & (iii)
Chapter 1	THE BACKGROUND	
	1.0 Introduction	1
	1.1 General Features of the Survey area	2
	1.1.1 Location & Boundaries	2
	1.1.2 Area & Landuse pattern	2
	1.1.3 Population & Socio-economic conditions of people	2
	1.1.4 Physical Features and Rivers of the area	3
	1.1.5 Climate	3
Chapter 2	DESIGN & METHODOLOGY OF THE SURVEY	
	2.1 Definition of 'Forest area'	6
	2.2 Sampling Design	6
	2.3 Methodology	7
Chapter 3	DATA PROCESSING	
	3.0 Preparation of data for processing on electronic computer	12
	3.1 Area computation	12
	3.2 Volume estimation	12
	3.3 Stand & stock tables	15
	3.4 Sampling error	16
Chapter 4	FOREST INVENTORY RESULTS	
	4.1 Forest area	17
	4.1.1 Distribution of forest area by landuse classes	18
	4.1.2 Distribution of accessible forest area by soil depth classes	21

Contents

		Page
	Distribution of accessible forest area by:	
	4.1.3 Soil texture classes	22
	4.1.4 Soil erosion classes	23
	4.1.5 Grazing incidence classes	24
	4.1.6 Plantation potential	25
	4.1.7 Fire incidence classes	26
	4.1.8 Size classes	27
	4.1.9 Regeneration status	28
	4.1.10 Injury to crop	29
	4.1.11 Degradation status of forest	30
	4.1.12 Forest types	31
	4.1.13 Forest type and canopy density classes	33
	4.2 Stand and Stock tables	36
	4.2.1 Analysis of the growing stock in forest types and its critical aspects	36
	4.2.2 Analysis of growing stock in districts.	44
	4.3 Sampling error	44
	4.4 Household fuel consumption in the survey area	46
MAPS	1. Location map of survey area	(i)
	2. Sketch showing sampling design and layout of plots	10
	3. Forest type map based on inventory results	32
Appendix I	Year of survey and publication of SOI topo maps used for forest inventory in Jammu region	82
Appendix II	Location of centre of sample plots visited for forest inventory	83-108
Appendix III	Inventory field forms(1 to 8)	113-120
BIBLIOGRAPHY		121

Contents

LIST OF TABLES

Tabele No.		Page
IV.4.1	Household fuel consumption in the survey area	47
IV.2.1 To IV.2.22	Volume/ha. by species and diameter classes and stems/ha by species and diameter classes in accessible tree forest area in each forest type	48-69
IV.2.23 To IV.2.30	Volume/ha by species and diameter classes and stems/ha by species and diameter classes in accessible tree forest area in each district.	70-77
IV.2.31	Volume/ha by species and diameter classes in accessible tree forest area in total survey area	78
IV.2.32	Total volume by species and diameter classes in accessible tree forest area in total survey area	79
IV.2.33	Stems/ha by species and diameter classes in accessible tree forest area in total survey area	80
IV.2.34	Total stems by species and diameter classes in accessible tree forest area in total survey area	81

Contents

FOREST SURVEY OF INDIA

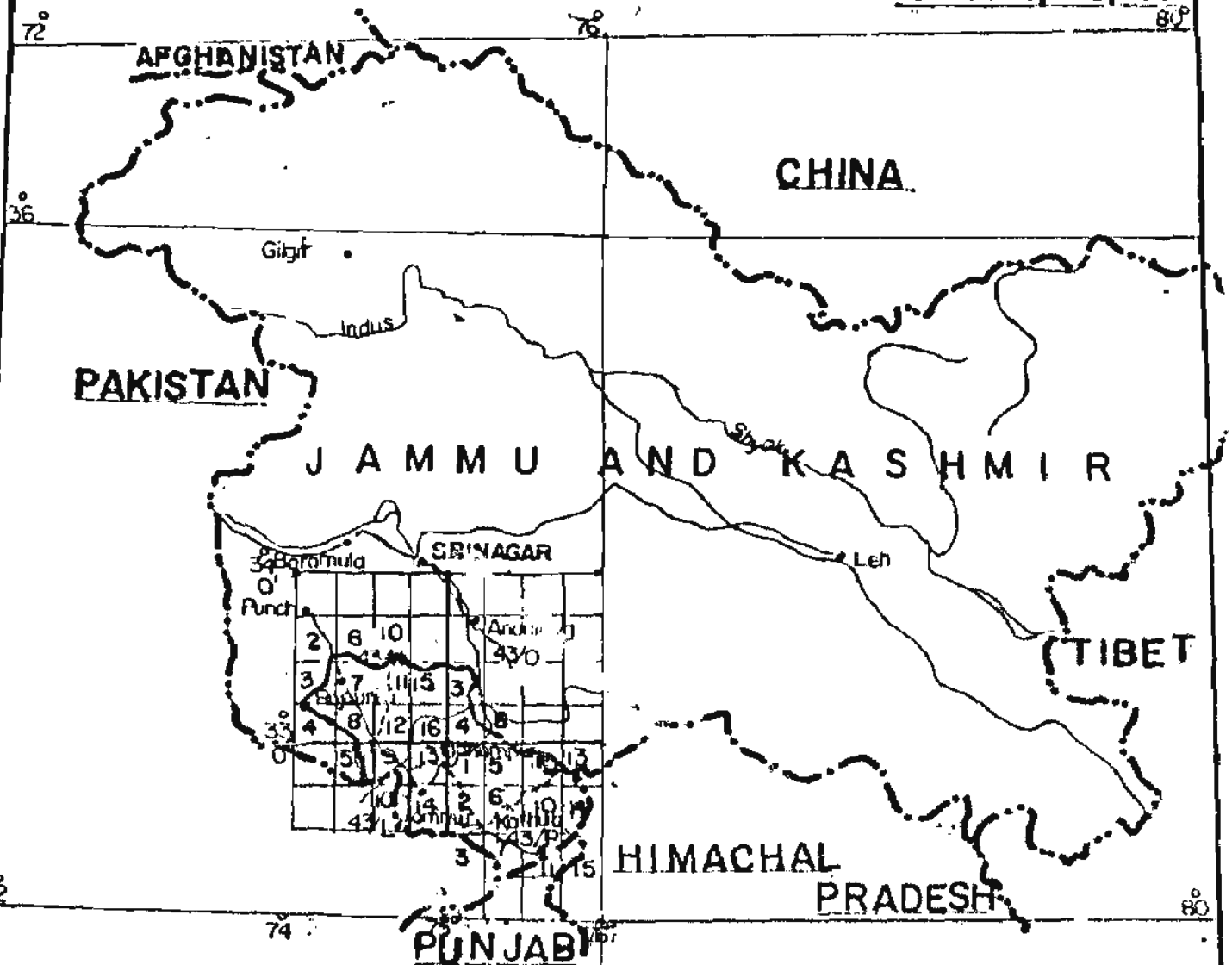
(Northern Zone)

SHIMLA

LOCATION MAP OF KATHUA, JAMMU, UDHAMPUR AND RAJAURI DISTRICTS

JAMMU AND KASHMIR

Scale: 1:4,000,000



INDEX

1	Boundaries:-
(a)	International
(b)	State
(c)	District
(d)	Project
2.	Road
3	Rivers
4	Map sheet Reference — 43K/12

Contents

SUMMARY

1. The forest inventory survey has been carried out in four districts viz Jammu, Kathua, Udhampur and Rajouri of Jammu region during 1982-83. The objectives of survey were to monitor change in land and forest resources to focus attention on its critical aspects, thereby helping in its development planning.

2. Total geographical area covered is 14009.81 km^2 of which 29 percent (4066.47 km^2) area was tree covered (shown by green wash in Survey of India topo sheets) taking 1964 as reference year (Mid year of the survey of areas for preparing toposheets used as basis for forest inventory). National forest policy lays down that 60 percent of the geographical area should be under forest in such hilly areas for its proper ecological balance and development. As observed from above, the region is deficient in forest area by about 50 percent from National Forest Policy norm.

3. During the past 19 years period (1964-1983), 8.70 percent (353.84 km^2) of the forest area (4066.47 km^2) has been deforested and diverted for other uses like agriculture/habitation etc. During the same period, there has been degradation in 3.46 percent (140.45 km^2) of tree forest to scrub, grassland and barren land due to pressure of biotic factors on the forest resources.

4. Out of the remaining 3572.18 km^2 area, 3191.20 km^2 is accessible tree covered area and 380.98 km^2 is inaccessible.

5. Area under accessible tree forest is 3191.20 km^2 of which 46.8 percent (1494.47 km^2) is having canopy cover of 30 percent to 69 percent, 38 percent (1210.11 km^2) has canopy cover 5 percent to 29 percent and 15.2 percent (486.62 km^2) is having canopy canopy cover of 70 percent and above. Thus 84.8 percent of accessible tree forest is open with average tree cover of 50 percent or less.

6. Regeneration over 91.50 percent of accessible tree forest area is either absent or inadequate.

7. 1037.83 km^2 area being 31.15% of total accessible tree forest, scrub, grass land and barren areas has been assessed as potentially plantable area.

Contents

8. 831.39 km^2 area being 24.95% of accessible tree forest, scrub, grass land and barren areas is subjected to heavy to moderate erosion.

9. Total area, per hectare estimated volume and stems in various forest types of accessible tree forest area has been found to be as follows:

Forest type	Total area (ha.)	Vol/ha. (m^3)	Stems/ha.
Fir	19541	293.399	94.413
Spruce	10633	302.815	240.796
Fir-Spruce	7630	330.574	154.771
Kail (Blue pine)	7502	278.370	147.000
Deodar	10719	370.007	234.111
Chir	127652	103.548	128.795
Mixed conifers	5252	325.532	190.001
Hardwoods mixed with conifers	31679	84.783	250.697
Upland hardwoods	46599	116.267	358.328
Khair	6317	20.256	134.367
Miscellaneous forest	45596	23.740	157.956
	3191.20		

Growing-stock varies from maximum 370.007 m^3 in deodar forest type to minimum 20.256 m^3 in khair forest type and number of stems from maximum 358.328 in upland hardwoods to minimum 94.413 in fir forest type.

10. Accessible tree forest area has total growing stock of 41.773 million cubic meter and 59.327 million stems.

11. In the vicinity of forests rural people meet their entire energy requirements from fuelwood/ agricultural waste and their per capita consumption per year is assessed at 1025 kgs.

Contents

Chapter 1

THE BACKGROUND

1.0 Introduction

Forests are essential to regulate water flow in rivers/streams, to check soil erosion, floods and droughts and to maintain the ecological balance and quality of environment for the survival of mankind. They are supplier of timber, fuelwood, fodder and minor forest products to meet day-to-day needs of local pupulation and raw material requirements of forest-based industries. Forestry activities generate vast employment opportunities particularly for rural poor. Thus, optimum planning and management of forest resources for economic development of the nation in general and the region in particular is of utmost importance.

Appreciating the potential of forest resources survey as a tool for helping in optimum planning and management, the Government of India created the Organisation of Forest Survey of India (FSI) and entrusted it with the functions to fulfil various objectives, of which relevant to forest inventory are:-

(a) to monitor periodically (on 10 year cycle) the changing situation of land and forest resources and present the data to focus attention on its critical aspects for rational planning;

(b) to serve the data needs of development planning of forest resources; and

(c) to present data in readily useable form for the national/state level planning organisations.

To fulfil these objectives, forest inventory was carried out in Jammu region comprising of Jammu, Kathua, Udhampur and Rajouri districts of J & K state. This report presents the results of the above region. 'Survey area' wherever appearing subsequently in this report will refer to this area.

These districts were selected for survey as these had not been covered earlier under Pre-investment Survey of Forest Resources carried in J & K region and also the decision taken in the Zonal Coordination Committee meeting held on 21.8.1982 of North Zone. The other consideration for taking up inventory work in the above districts has been the availability of topographic maps of the area which are the basic requirement for taking up inventory work in any area.

Contents

1.1 General Features of the Survey area

Land-use pattern, population and climate relating to Survey area are given in Table 1.1.1 and 1.1.2. These and other features of survey area are described in the following paras.

1.1.1 Location & Boundaries

The survey area lies between 74°-0' to 76°-0' East longitudes and 32°-15' to 33°-45' North latitudes. It is bounded on the east by river Ravi which forms boundary between H.P. & J & K state, on south by Punjab state, on the west lies international border with Pakistan and to north lies Doda and Poonch districts of J & K state. Survey on the western international boundary was confined to the area upto which defence authorities permitted the entry of our field crews. The delineation on toposheets, of boundaries of districts/forest divisions was done in consultation with local revenue/forest officials.

1.1.2 Area and Land-use pattern

On the basis of Statistical hand book (1980-81) issued by the J & K Govt. the total area (Table 1.1.1) under various land uses is 14009.81 km^2 of which 33.42 percent is croped area, 29.76 percent (4169.59 km^2) under forest, 14.42 percent under non-agricultural use, 10.07 percent is barren/unculturable and 5.43 percent constitute culturable waste. Thus cultivation and forest forms two major land uses in the area. However, total area derived by adding areas under various land uses is observed to be more than the total geographical area indicated in land utilization table of District Statistical hand books. Variation between these figures is not explained in the Statistical books. Forest area as reported in the State Statistics is 416959 hectares whereas forest area (green wash) computed from Survey of India maps and given in Chapter 4 of this report is 406647 hectares. These two figures vary. The reason for variation may be due to the fact that State Government statistics reports the area under control of the forest department and may include lands devoid of vegetation also whereas forest area computed from Survey of India topographical maps is only the tree covered area (shown by green wash) irrespective of its ownership or legal status.

1.1.3 Population & Socio-economic conditions of People

Total population of the survey area is 20.44 lakhs as against 59.54 lakhs for the whole of J & K

Contents

state. Thus almost one third of state population resides in the survey area. About 90 percent of population is rural, engaged in agriculture whose holdings are generally less than 2 hectares. Sizeable population is engaged in rearing sheep/goats, most of which is migratory in nature. As per 1977 cattle census, area had cattle population of 19 lakhs of which about one third were sheep/goats. In Rajouri district, large number of workers are engaged in sericulture as rearers of silk worms. Rural population is dependent upon forest for meeting their requirements of fuelwood, small timber for construction/repair of house/agricultural implements, fodder, grazing etc. Besides, the forest resources of the area cater to the needs of timber, firewood/charcoal and other raw materials for wood-based industries in urban areas.

1.1.4 Physical Features and Rivers of the area

The area is mostly hilly with moderate to steep slopes. It is cut up with narrow valleys except southern portion adjoining Punjab, which is plain. Altitude in the area varies from 275 metres at Rathua in Kathua district to 4660 metres at Dhakyar in Rajouri district. Chenab, Jammu Tawi and Neshera-Manewar Tawi are important rivers passing through the area and ultimately joining Indus river in Pakistan. These rivers have good hydro-electric potential particularly Chenab, over which Salal Hydro-electric project with 345 MW capacity at a place Salal is under construction. When completed, its reservoir is expected to submerge an area of about 9.35 km^2 upto Arnas village.

1.1.5 Climate

Climate varies from sub-tropical in the lower part to temperate experiencing heavy snow in winter at higher altitudes. Annual rainfall varies from 150 mm to 3403 mm. Minimum-maximum temperature varies from 6.5 to 39.4 degrees celsius in the area.

Contents

Table 1.1.1

Land use pattern in the Distts

Unit - Hectare

Distt.	Forests	Not available for cultivation: Land put to non-agriculture use.	Not available for cultivation: Barren & unculturable land	Permanent pastures and other grazing land	Land under miscellaneous crop and grooves not included in net area sown.	Culturable waste	Cropped area.	Total (col 2 to 8)
1	2	3	4	5	6	7	8	9
Jammu	48245 (13.28)	39106 (10.76)	47727 (13.14)	11007 (3.03)	3054 (0.84)	29277 (8.06)	184881 ~~(57.75)~~ (50.89)	363297 (100)
Kathua	87274 (29.90)	31776 (10.89)	28517 (9.77)	11109 (3.81)	18549 (6.36)	8624 (2.95)	105993 (36.32)	291842 (100)
Udhampur	188919 (41.34)	88392 (19.34)	25823 (5.65)	13277 (2.91)	19428 (4.25)	19977 (4.37)	101184 (22.14)	457000 (100)
Rajouri	92521 (32.03)	42682 (14.78)	38949 (13.48)	20137 (6.97)	194 (0.07)	18248 (6.32)	76111 (26.35)	288942 (100)
Total	416959 (29.76)	201956 (14.42)	141016 (10.07)	55530 (3.96)	41225 (2.94)	76126 (5.43)	468169 (33.42)	1400591 (100)

Note :- Figures in bracket represent percents of total area.

Source:- Statistical Hand book (1980-81) of respective district issued by Govt. of J & K.

Contents

Table 1.1.2

Item (Unit)		Districts				
		Jammu	Udhampur	Rajouri	Kathua	Total
Total population (Lakhs) 1981 Census		9.28	4.52	2.99	3.65	20.44
Live Stock (Lakhs) 1977 Census	Sheep/goats	1.35	2.89	1.21	1.38	6.83
	others	4.15	3.40	2.00	2.62	12.17
	Total	5.50	6.29	3.21	4.00	19.00
Annual rainfall variation (mm)		230 to 2880	Not available	150 to 1683	934 to 3403	-
Monthly variation of temperatures (Degree Centigrade)	Mean Max.	8.3 to 39.4	Not available	Not available.	Not available	-
	Mean Minimum	6.5 to 27	-do-	-do-	-do-	-

Source: Statistical Hand book (1980-81) of respective districts issued by Govt. of J & K.

Contents

Chapter 2

DESIGN AND METHODOLOGY OF THE SURVEY

2.0 To monitor the change in forest cover, thematic maps prepared by interpretation of latest aerial-photographs were ~~ex~~ to be used. Such thematic maps were to form the basis for collection of growing-stock data. However, thematic maps were not available due to constraints beyond control of the organisation. Therefore, the 'forest areas' marked on 1:50,000 scale topographic map sheets prepared by the Survey of India were used as the basis of forest inventory. The year of topographic survey and publication of maps used in the survey area given in Appendix I.

2.1 Definition of 'Forest Area'

The following are treated as 'Forest areas' for carrying out the forest inventory.

(i) All those areas shown in green wash on the Survey of India toposheets.

(ii) All such areas in which words such as thick jungle, thick forest, dense jungle, open forest, bamboos etc. are printed.

Unless explicitly stated otherwise, 'Forest Area' in this report shall henceforth mean areas of the categories mentioned above.

2.2 Sampling Design

Each of the 1:50,000 Survey of India topographic sheets falling in the survey area

Contents

was divided into 36 grids of 2½'x 2½' of latitudes and longitudes. In each of such grid, two sample points were marked. The inventory data was collected from a square plot of 0.1 hectare laid out at each of these sample points on the ground. The method of marking the sample point on the map is described below:-

One side of the square plot (which is 31.62 metres on the ground) measures 0.6 mm to the nearest first decimal in mm on the above topographic map. The length and width of each grid is measured to the first decimal in millimetres. From this length, 0.6 mm is deducted so as to prevent the plot centre from falling on the origin or on the peripheries of the sampled grid. Suppose the measurable length and width of a grid along its X & Y axes are 83.5 mm and 92.5 mm. respectively, after deducting 0.6 mm, the reduced length and width are 82.9 mm and 91.9 mm respectively. A three digit random number is selected from the random number table for each axis separately. If the selected random numbers are less than 829 and 919 respectively then they are retained as such, otherwise the next random number is considered. Suppose the random numbers selected are 144 and 161 respectively, then these numbers will correspond to 14.4 mm and 16.1 mm lengths along the X & Y axis respectively. To these lengths viz. 14.4 mm and 16.1 mm, 0.3 mm is added (being half the measurable side on a topographic map used). Now 14.7 mm and 16.4 mm become the co-ordinates of the first sample point in the grid. Taking SW corner of this grid as origin and measuring 14.7 mm and 16.4 mm along X & Y axis respectively the centre of the first plot is marked. The centre of the first plot is then joined by a straight line to the grid centre and this line is extended further beyond the grid centre. On this extended line, the second point is marked at a distance equal to the distance of first point from grid centre. This point is the centre of the second plot. All sample points falling in 'forest areas' are located on the ground and quantitive data is collected from the sample plots and qualitative data from the sorrounds of the plot. The co-ordinates of the plot centres inventoried and the relevant data pertaining to these plots are given in Appendix II.

2.3 Methodology

The field data is collected by a crew consisting one Junior Technical Assistant (Crew Leader), assisted by a Deputy Ranger,

Contents

two to three fieldmen, Khalasi and labour hired locally wherever necessary. The Crew leader is provided with a list of sample plots to be surveyed by his crew during the season alongwith a set of toposheets with sample points already marked. A set of measuring instruments viz. Silva compass, Haga/Blume Leiss hypsometer, Callipers, measuring tapes and ranging rods etc. are provided.

After deciding the plot and the grid number to be surveyed on a particular day from a camping spot, the Crew leader reaches a prominent physical feature (also called starting reference point as near to the sample point as possible) which is depicted on the map and can also be identified on the ground. Usually the following features are selected as reference points:

i) Bench marks;
ii) Triangulation points;
iii) Village tri junction points;
iv) Old bridges and culverts;
v) Old temples, mosques and churches;
vi) Crossing of rail track with roads, rivers, streams;
vii) Junction of rivers or streams and roads;
viii) Junction of streams;
ix) Junction of roads;
x) Prominent bends in roads, rivers, streams;
xi) Old ponds and wells;
xii) Springs;
xiii) Prominent topographical features in hilly region such as spurs, knolls etc.
xiv) Mile stones or kilometer stones;
xv) Boundary pillars (of international, state, district and forest boundaries).

Having located a prominent physical feature (reference point) both on the ground as well as on the map, the distance and bearing of the sample point from this physical feature is measured from the map. The bearing is measured with the help of a protractor or the Silva Compass. At this reference point the Crew leader records details of the reference feature used, the bearing and distance of the sample point from the reference feature, the name of the camping spot, the time taken to complete the work etc. in 'Plot Approach Form'. Information in this form is used in time and cost study for the inventory and helping to relocate the point at a future date. Specimen

of this form is given in Appendix III. From the reference point, Crew leader traverses the distance in the direction as measured on the map to reach the sample point. A wooden peg is fixed at this location which is the centre of the sample plot. After reaching at sample point, a square sample plot of 0.1 hectare with diagonals measuring 44.72 metres in NE-SW and NW-SE directions is laid out on the ground by marking its four corners by thin poles. Regeneration data is collected from a plot measuring 4 m x 4 m and herb-shrub data from a plot of 2 m x 2 m size laid out around the plot centre. Sampling design and layout of the sample plots is explained in the sketch on page 10.

After laying out the plots, the Crew leader with the help of other crew members collects the inventory data in the following field forms:

(i) Plot Description form;
(ii) Plot Enumeration form;
(iii) Sample Tree form;
(iv) Bamboo Enumeration form (clump forming);
(v) Bamboo Enumeration form (non-clump forming);
(vi) Bamboo weight form;
(vii) Herbs and Shrubs data form.

The specimen of above field forms may be found in Appendix III. Their brief description is as under:-

(i) Plot Description Form (PDF)

Qualitative data such as land use, crop composition of tree crop and its density, erosion in the area, fire and grazing incidence, regeneration status etc. are recorded in this form. The basis of assessments is occular by examining a surrounding area of about 2 hectare around the plot centre.

(ii) Plot Enumeration Form (PEF)

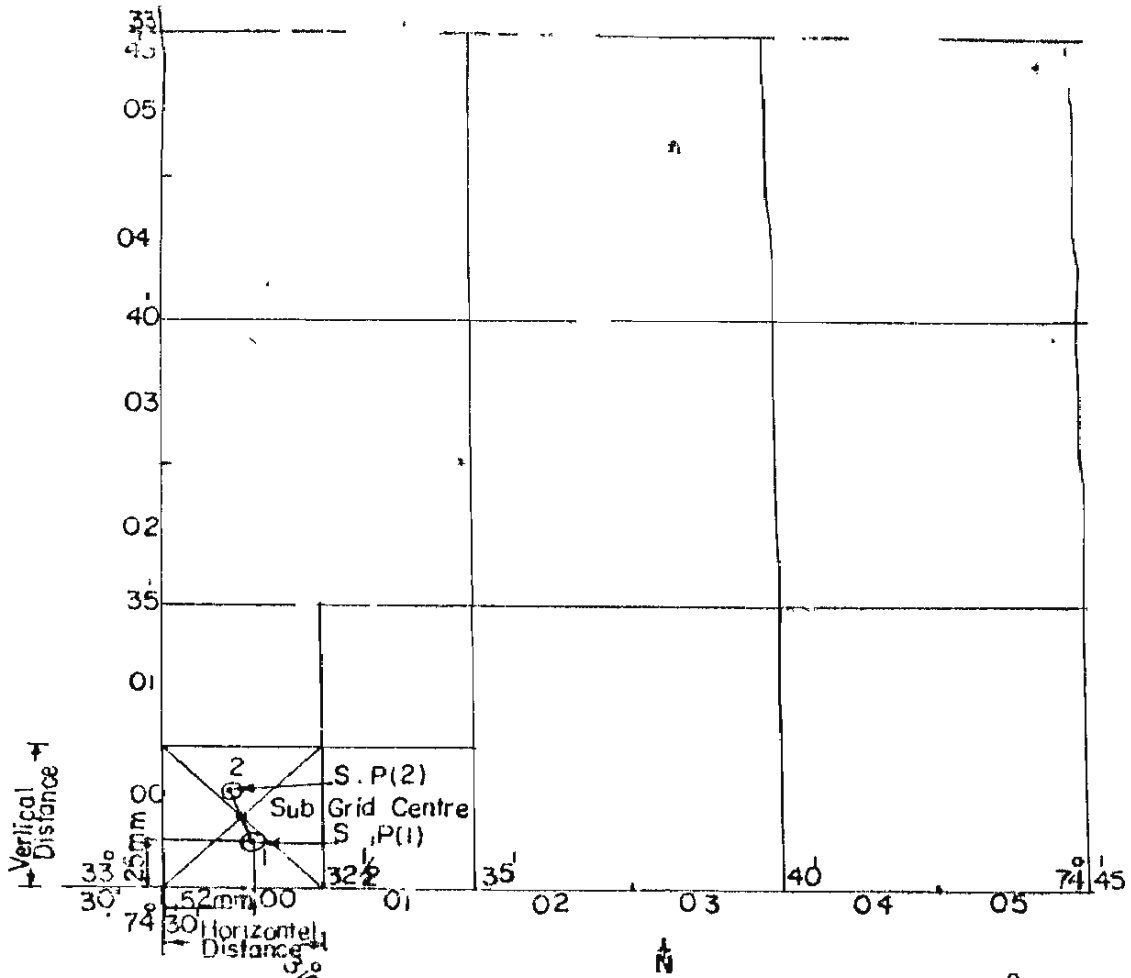
In this form trees in 0.1 hectare plot are enumerated and recorded with the name of species and diameter at breast height. Total number of bamboo clumps occuring in the plot are also recorded.

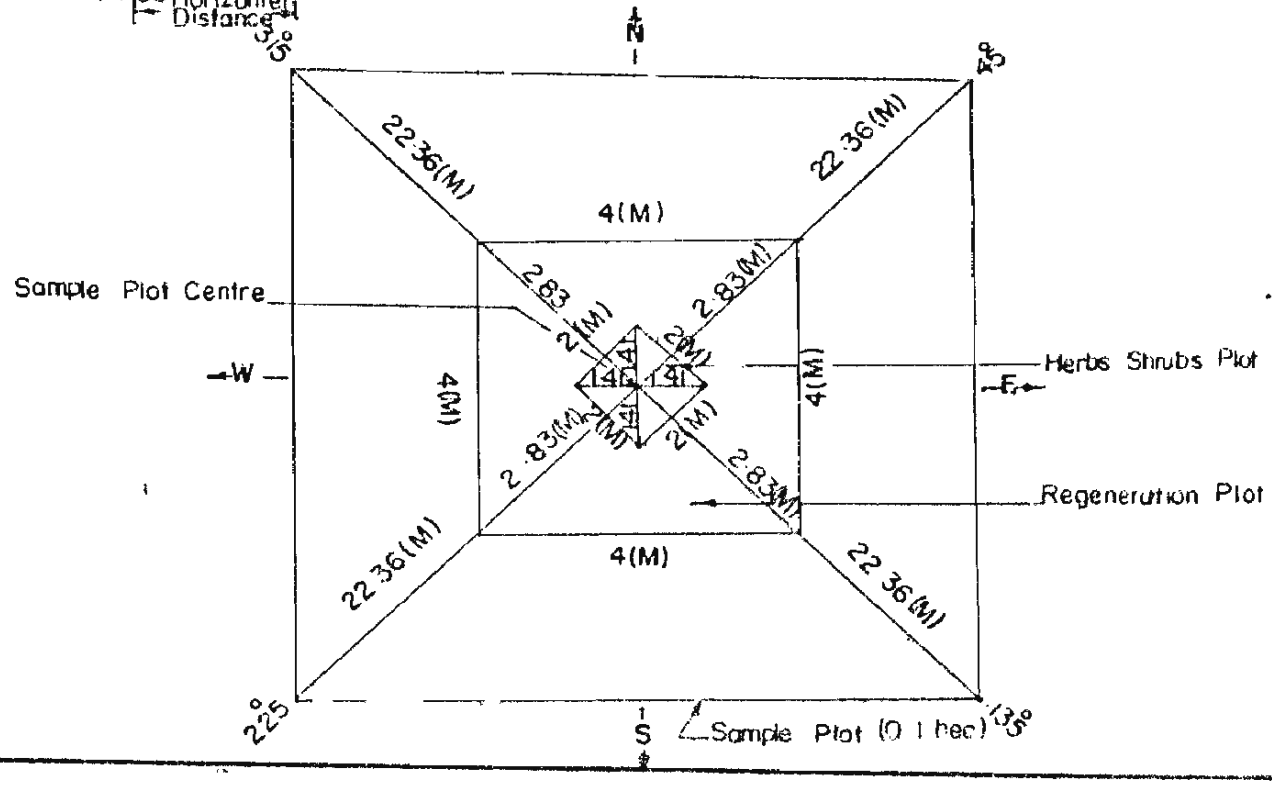
(iii) Sample Tree Form (STF)

The data in this form are collected from the northern quarter of the sample plot. Name of the species, diameter at breast height, twice bark thickness dominance status, length of the clear bole and weight

Contents

SKETCH SHOWING SAMPLING DESIGN AND LAYOUT OF PLOTS





Contents

of each tree enumerated in this quadrant are recorded. The data from this form helps in developing local volume equations for the species in the survey area. Under bark volume is also derived from the local volume equations with the help of bark thickness data.

(iv) & (v) Bamboo Enumeration (Clump and Non-clump Forming) Forms

These forms are used wherever bamboo clumps are encountered in the sample plots. Data such as culms in each clump, their size, maturity condition, length etc. are recorded.

(vi) Bamboo Weight Form

For determining the co-relation between green and dry weight of the utilizable length of bamboo culm, data on weight are recorded in this form.

(vii) Herbs and Shrubs Data Form:

In this form, names and other details of all identifiable species of herbs and shrubs are recorded. In case of species that could not be identified in the field, the number of such species only are noted.

The above is a brief description of the design and survey methodology. For details 'The manual of instructions for field inventory' of Forest Survey of India may be referred whose copy can be had from the Director, Forest Survey of India, 25-Subhash Road, Dehradun or Joint Director, Forest Survey of India, Northern Zone, Shimla (H.P.).

Contents

Chapter 3

DATA PROCESSING

3.0 Preparation of data for processing on electronic computer

The basic field inventory data collected in various field forms of the region after completion of field work were sent to Data Processing Unit of the Organisation at Dehradun. The field forms were checked there for detecting inconsistency in the data and same rectified. Data was processed on the electronic computer. For the purpose, the coded data of field forms was first transferred on to punch cards using punching machine, verified to detect punching mistakes and to correct same with the help of card verifier, sorted and loaded on magnetic disk/tapes for final processing in computer. Listings of data loaded on tape/disk were taken out to check complete and proper sequence of data loaded. Suitable computer programmes were framed to get the results in desired form.

3.1 Area computation

The forest area was calculated from 1:50,000 topographical maps by using dot grid/planimeter in the zone and supplied districtwise to Data processing unit. Further distribution of forest area under various classes such as landuse, accessible tree forest, forest type, soil erosion status, grazing incidence, fire incidence, canopy density classes etc. was arrived at proportionately using ratio [illegible]. However, it may be noted that area tables are based on very few sample points and therefore, should be considered as indicative only and used with due caution.

3.2 Volume Estimation

Collection of felled tree data by zones for developing general volume equations has been discontinued. Therefore, the height diameter data of sample trees of current survey area were compared with height diameter data of other project areas completed by this organisation in the past for which general volume equation of species were available based on actual felled

t[illegible] data [illegible] those found to match most closely were adopted for the present area. General volume equations adopted for different species were as under:-

(i) Abies pindrow (Chenab)

$V = 0.070762 + 0.302174\ D^2\ H$ for $D^2\ H \leq 10$

$V = 0.859831 + 0.250497\ D^2\ H$ for $D^2\ H > 10$

(ii) Abies smithiana (Uttarkashi)

$V = 0.03370 + 0.28318\ D^2\ H$

(iii) Cedrus deodara (Chenab)

$V = 0.091531 + 0.294023\ D^2\ H$ for $D^2\ H \leq 10$

or $V = 0.354658 + 0.253916\ D^2\ H$ for $D^2\ H > 10$

(iv) Pinus excelsa (Chenab)

$V = 0.070572 + 0.296062\ D^2\ H$ for $D^2\ H \leq 10$

or $V = 0.724684 + 0.239729\ D^2\ H$ for $D^2\ H > 10$

(v) Pinus roxburghii (Chenab)

$V = 0.019541 + 0.297110\ D^2\ H$

(vi) Lannea [illegible] mandelica (Rajasthan)

$V = 0.004511 + 0.377131\ D^2\ H$

(vii) Quercus incana (Uttarkashi)

$V = 0.01480 + 0.31906\ D^2\ H$

(viii) Rest of the species

$V = 0.012804 + 0.327[illegible]2\ D^2\ H$

N.B. (a) Name in bracket against the species indicate the catchment area surveyed in past by the organisation whose general volume equation has been adopted.

Contents

(b) In the above equations:-

V = Underbark volume (m^3) upto 5 cm. top overbark limit

D = Breast height overbark diameter (m)

H = Total standing height (m)

The height and diameter of each sample tree were substituted in the selected general volume equation of corresponding species to estimate sample tree volume. Scatter diagram was prepared diagram was prepared by plotting estimated sample tree volume of all the trees of a species against corresponding diameter to detect abnormal tree volume. After examining the data correspondant to abnormal volume, a decision was taken whether to retain the volume or reject it in developing local volume equations. The estimated sample tree volume or its transferred form was taken as dependent variable and breast height overbark diameter or its transformed form as independent variable to devel local volume equation of each species. Following regression functions were tried for each species:-

$$V = a + bD^2$$

$$\sqrt{V} = a + bD + c\sqrt{D}$$

$$V = a + bD + cD^2$$

$$V = a + bD + cD^2 + dD^3$$

$$V = a + b\sqrt{D} + cD^2$$

$$\frac{V}{D^2} = a + \frac{b}{D^2}$$

$$\frac{V}{D^2} = a + \frac{b}{D} + \frac{c}{D^2}$$

$$\frac{V}{D^2} = a + \frac{b}{D} + \frac{c}{D^2} + dD$$

Where V & D have the same units as in gen volume equation. One of the regression function was selected taking into consideration, the standard error of estimate, the multiple determination coefficient and the applicability of the equation in the entire range of data.

The following local volume equations were selected for different species.

(i) Abies pindrow (54) R^2 0.67218

$$V = 0.15631 - 1.95132\ D + 12.3304\ D^2$$

(ii) Abies smithiana (107)

$$\sqrt{V} = 0.20050 + 4.58840\ D - 1.42603\sqrt{D} \quad R^2\ 0.98378$$

(iii) Cedrus deodara (74)

$$\sqrt{V} = 0.67872 + 5.71233\ D - 2.95629\sqrt{D} \quad R^2 = 0.97590$$

(iv) Pinus excelsa (57)

$$V = 0.20720 - 2.24612\ D + 12.50978\ D^2 \quad R^2 = 0.67346$$

(v) Pinus roxburghii (455)

$$V = 0.07565 - 1.11851\ D + 7.07064\ D^2 + 3.85072\ D^3 \quad R^2 = 0.73324$$

(vi) Lannea coromandelica (34)

$$\sqrt{V} = -0.13428 + 2.57874\ D \quad R^2\ 0.96425$$

(vii) Quercus species (471)

$$V = 0.04430 - 0.84266\ D + 6.36239\ D^2 + 2.27556\ D^3 \quad R^2 = 0.94445$$

(viii) Rest of species (499)

$$V = -0.03316 + 0.77262\ D - 0.50833\ D^2 + 11.50107\ D^3 \quad R^2 = 0.30916$$

The number in bracket against the species indicate the number of trees onthe basis of whose data local volume equation was developed.

3.3 Stand and Stock tables:

The volume of each enumerated tree of a species was estimated by substituting its breast height ov bark diameter in local volume equation of that species. The volumes converted to per hectare were stored in a tree/plot volume file together with species code, diameter of tree, parameters of plot description & form, per hectare volume and stems of the plot. The elements of information stored in the above files were utilised

Contents

to classify the tree by species and diameter. Estimates of number of stems and volume per hectare and total by species and diameter classes were obtained for different strata viz. district, forest types etc.

3.4 Sampling error

The sample was considered to constitute a simple random sample of unequal clusters as in many cases only one plot was available from a grid. The sampling error was calculated as follows:

Let n = Total No. of clusters (grids) in the sample

x_i = The No. of plots in the ith cluster (grid)

y_i = The total of per hectare volume in the ith cluster.

$$\bar{x} = \sum_{i=1}^{n} \frac{x_i}{n} = \text{Avg. No. of plots per cluster}$$

$$\hat{R} = \frac{\sum_{i=1}^{n} y_i}{\sum_{i=1}^{n} x_i} = \text{Estimate of average volume per hectare over all clusters}$$

Estimate of the variance of $\hat{R}$

$$\hat{V}(\hat{R}) = \frac{N-n}{N n \bar{x}^2} \frac{\sum_{i=1}^{n} (y_i - \hat{R} x_i)^2}{(n-1)}$$

$$= \frac{1}{n(n-1)\bar{x}^2} \times \sum_{i=1}^{n} (y_i - \hat{R} x_i)^2$$

(Ignoring finite population correction factor)

$$= \frac{1}{n(n-1)\bar{x}^2} \left(\sum_{i=1}^{n} y_i^2 - 2\hat{R} \sum_{i=1}^{n} x_i y_i + \hat{R}^2 \sum_{i=1}^{n} x_i^2 \right)$$

Estimate of Standard error of $\hat{R}$

$$S.E. = \sqrt{\hat{V}(\hat{R})}$$

$$S.E.\% = \frac{S.E.}{\text{Mean}} \times 100 = \frac{S.E. \times 100}{R}$$

Contents

Chapter 4

FOREST INVENTORY RESULTS

4.0 In this chapter, the results o forest inventory and the critical aspects of forest resources as evident therefrom in the survey area are presented. This is a very low intensity survey (0.01 percent). Its results are therefore, reliable and valid for the region as a whole. However, district-wise information of some attributes has also been given which may be considered as indicative only.

4.1 Forest area

'Forest area' has already been defined in Chapter 2. Forest inventory survey comprise of two components, namely information with regard to area under forest cover (forest area) which is computed from maps and estimation of growing stock by ground sampling in such areas.

The survey area is covered by 30 toposheets viz. 43 K/2, 3,4,6,7,8,10,11,12,15 & 16, 43 L/5,9, 13 & 14, 43 O/3,4 & 8, 43 P/1,2,3,5,6,7,9,10,11, 13,14 & 15 which were used as the basis for inventory. These toposheets were surveyed by Survey of India during the period 1956-57 to 72-73. Since the sheets used were prepared over a period of time, the year 1964 mid-way between this period has been taken as the base year for monitoring the changes in the forest area (green wash) subsequently till 1983 (when field inventory was done). Forest area in these s ts has been computed by dot grid method and the same alongwith number of sample poi s inventoried therein are given in table 4.1.

Table 4.1

Forest area (Green wash on 1:50,000 S.O.I. toposheet computed by dot grid) district-wise and number of sample points inventoried therein.

District	Forest area (hectare)	No. of sample points inven-toried	Weightage of area (hectar per point
1	2	3	4
(1) Jamma	48251	64	753
(2) Kathua	80912	102	793
(3) Udhampur	189805	253	750
(4) Rajouri	87679	104	843
Total	406647	523	

Contents

Distribution of area in all the tables that follow has been worked out on the basis of ratio estimator.

4.1.1 Distribution of forest area by land-use classes

Total forest area surveyed is 4066.47 km^2 of which 78.48 percent (3191.20 km^2) is under accessible tree forest, followed by 9.36 percent (380.98 km^2) as inaccessible, 8.70 percent (353.84 km^2) is under agriculture/habitation and remaining 3.46 percent (140.45 km^2) is under scrub, grass or barren. 49 sample points (representing 380.98 km^2 area) could not be visited due to difficult terrain and have been classified as inaccessible. However, since these points are shown on Survey of India toposheets, to fall in green wash, it could be safely assumed that these points (areas) at present also bear forest because of absence of human disturbance due to its inaccessibility. No data in respect of these points could be collected during inventory. Break up of forest area by land-use as found during inventory is given by districts in table IV.1.1. On further examination of data therein, following critical aspects about state of forest resources in the area are evident.

(a) Only 29.76 percent (4066.47 km^2) of total reported area of 14009.81 km^2 in the region was under forest cover in the year 1964 (reference year). National forest policy envisages 60% of geographical area to be under forest cover in such hilly areas for its proper ecological balance and development. Thus forest area in the region is far less than laid down in the national forest policy. Hence, there is a need to bring more areas under tree cover in the region for its ecological balance as well as economic development of the region.

(b) During the past 19 years period (1964-1983), 8.70 percent (353.84 km^2) of the forest area (4066.47 km^2) has been deforested and diverted for other uses like agriculture/habitation etc. During the same period, there has been degradation in 3.46 percent (140.45 km^2) of tree forest to scrub, grassland and barren land due to pressure of biotic factors on the forest resources. Thus, existing area under forest cover can be said to be shrinking at the rate of 1/2 percent annually.

Contents

Table No. IV.1.1

Distribution of Forest area (Tree covered shown by green wash on topo sheets) and number of sample points inventoried therein by land use and districts.

No.	Land use	DISTRICTS: Udhampur		Jammu		Kathua		Rajouri		Total	Area (km^2)	%
		No of sample points	Area (km^2)	No of sample points	Area (km^2)	No of sample points	Area (km^2)	No of sample points	Area (km^2)	No of sample points		
	Dense tree forest	32	240.07	1	7.54	11	87.26	18	151.75	62	486.62	11.9
2	Moderately dense tree forest	111	832.75	17	128.17	29	230.04	36	303.51	193	1494.47	36.75
3	Open tree forest	61	457.64	27	203.56	32	253.84	35	295.07	155	1210.11	29.7
4	Scrub forest	-	-	2	15.08	2	15.86	1	8.43	5	39.37	0.97
5	Govt. Grass land	-	-	-	-	1	7.93	-	-	1	7.93	0.0
06	Barren land	2	15.00	3	22.62	7	55.53	-	-	12	93.15	2.2
07	Agricultural lands without trees in surround.	11	82.52	2	15.08	6	47.60	4	33.72	23	178.92	4.4
08	Agricultural lands with trees in surround	11	82.52	6	45.23	5	39.67	-	-	22	167.42	4.1
09	Habitation	1	7.50	-	-	-	-	-	-	1	7.50	0.1
10	Inaccessible points/area	24	180.05	6	45.23	9	71.39	10	84.31	49	380.98	9.3
	Total:-	253	1898.05	64	482.51	102	809.12	104	876.79	523	4065.47	100.
(a)	Total forest area (01 to 0[illegible])	230	1725.51	56	422.20	91	721.85	100	843.07	477	3712.63	91.3
	Accessible tree forest area (01+02+03)	204	1530.46	45	339.27	72	571.14	89	750.33	410	3191.20	78.4
(c)	Forest area deforested or diverted for other uses (07+08+09)	23	172.54	8	60.31	11	87.27	4	33.72	46	[illegible]	8.7
	Forest area degraded to scrub/barren land/grass (04+05+06)	2	15.00	5	37.70	10	79.32	1	8.43	18	140.45	3.[illegible]

Contents

Explanatory Note: i) Dense tree forest, moderately dense forest and open tree forest are those with tree canopy of 70% and above, 30% to 69% and 5% to 29% respectively. Scrub forest is inferior tree growth chiefly of small and stunted trees with canopy density less than 5%.

ii) Barren lands - Includes areas with exposed surface like rock sheets, sand dunes, swamps and area without any vegetation.

Contents

(c) Area under accessible tree forest is 3191.20 km^2 of which 46.8 percent (1494.47 km^2) is having canopy cover of 30 percent to 69 percent, 38 percent (1210.11 km^2) has canopy cover 5 percent to 29 percent and 15.2 percent (486.62 k is having canopy cover of 70 percent and above. Thus 84.8 percent of accessible tree forest is open with average tree cover of 50 percent or less. Such open areas are susceptible to soil erosion. Production from such areas is also low.

Above trends viz area under forest cover bei far less than required for proper ecological balance and to meet the demands of goods and services, further shrinking of forest cover could be catastrophic if not in long run checked timely. Hence, greater attention is needed in future to increase area under forest cover as well as stocking of open forest areas.

4.1.2 Distribution of accessible forest area by soil depth classes

Total forest area is 3712.63 km^2 out of which 380.98 km^2 is inaccessible (Table IV.1.1) leaving 3331.65 km^2 area as accessible which actually could be visited during inventory. Information in subsequent tables relates to accessible forest area i.e. 3331.65 km^2.

Distribution of accessible forest area by soil depth classes is given in Table No. IV.1.2.

Table No. IV.1.2

Distribution of accessible forest area by soil depth and district.

Total area : 3331.65 km^2
Total sample points: 428
Unit km^2

S.No. Soil depth class	District				Total
	Udhampur	Ja..u	Kathua	Rajouri	
1. No soil	-	-	-	8.43	8.43
2. Soil depth less than 15 cms.	37.51	7.54	39.66	8.43	93.14
3. Soil depth 15 cms or more but less than 30 cms.	292.58	22.62	95.19	143.32	553.71 1
4. Soil depth 30 cms or more but less than 90 cms.	742.72	203.56	356.96	480.55	1783.79
5. Soil depth 90 cms or more	450.14	120.63	111.05	118.03	799.85
6. *Unrecorded	22.51	22.62	47.60	-	92.73
Total	1545.46	376.97	650.46	758.76	3331.7

* Unrecorded relate to those points where inf r ation c ... not be collected.

Contents

As may be observed from the above table that 53.54 percent of area in the region is having soil depth 30 cms to 90 cms followed by 24 percent area having soil depth greater than 90 cms, 16.63 percent area having soil depth from 15 cms to 30 cms and remaining 5.83 percent area has less than 15 cms soil depth. In areas having soil depth less than 30 cms, more emphasis should be given to conserve soil by undertaking soil conservation measures to improve their productivity. For the present these areas may be able to support grass or shallow rooted tree species only.

4.1.3 Distribution of accessible forest area by soil texture classes:

61.02 percent (2032.96 km^2) of the area has clayey loam soil followed by 22.86 percent (761.57 km^2) under sandy loam, 11.96 percent (398.49 km^2) under loam and remaining 4.16 percent (138.63 km^2) fall under other types. Thus region does not have any significant areas requiring specific treatment or choice of species from the point of view of soil texture. Good textured soils are encountered over major portion of the area. Districtwise distribution of area by soil texture classes is given in Table No. IV.1.3.

Table No. IV.1.3

Distribution of forest area by soil texture and Districts

Total sample points: 428
Total area: 3331.65 km^2
Area Unit: km^2

S.No.	Soil texture	Districts				Total	%
		Udhampur	Jammu	Kathua	Rajouri		
1.	Clayer	15.00	-	-	-	15.00	0.45
2.	Clayey loam	1155.35	67.85	261.77	547.99	2032.96	61.02
3.	Loam	187.56	15.08	103.11	92.74	398.49	11.96
4.	Sandy loam	157.55	263.88	222.11	118.03	761.57	22.86
5.	Sandy	15.00	7.54	15.87	-	38.41	1.15
6.	Unrecorded	15.00	22.62	47.60	-	85.22	2.56
	Total	1545.46	376.97	650.46	758.76	3331.65	100.00

Contents

4.1.4 Distribution of accessible forest area by soil erosion classes:

Excessive soil erosion has not been noticed on large scale in the area. Only 4.39 percent (146.52 km^2) of area has heavy erosion while 20.56 percent (684.87 km^2) is subject to moderate erosion and 72.73 percent (2422.98 km^2) area is subject to mild erosion. Areas having heavy erosion will need special attention to avoid further degradation of site by taking up soil conservation measures. Districtwise distribution of forest area by soil erosion classes is given in Table No. IV.1.4.

Table No. IV.1.4

Distribution of forest area by soil erosion status and districts:

Total sample points: 428
Total area: 3331.65

Unit km^2

Erosion status	Districts					
	Udhampur	Jammu	Kathua	Rajouri	Total	%
Mild erosion i.e. no erosion or slight erosion where only surface erosion taken place	1170.35	188.48	372.83	691.32	2422.98	72.73
Moderate erosion i.e. where small gullies and rills are formed on the top surface of soil	307.60	143.25	166.58	67.44	684.87	20.56
Heavy erosion i.e. areas which have deep gullies, ravines, land slips etc.	52.51	22.62	71.39	-	146.52	4.39
Unrecorded	15.00	22.62	39.66	-	77.28	2.32
Total	1545.46	376.97	650.46	758.76	3331.65	100.00

Contents

4.1.5 Distribution of accessible forest area by grazing incidence classes:

17.22 percent (573.77 km^2) area is subject to heavy grazing, 52.15 percent (1737.64 km^2) area to medium grazing and rest of the area experience light grazing. Heavy grazing is detrimental to forest regeneration, growth and need to be controlled. Districtwise distribution of forest area by grazing incidence classes is given in Table No. IV.1.5.

Table No. IV.1.5

Distribution of accessible forest area by grazing incidence classes and districts

Total sample points: 428
Total area: 3331.65
Area unit : km^2

S.No.	Grazing incidence	Districts					
		Udhampur	Jammu	Kathua	Rajouri	Total	%
1.	Heavy grazing	225.07	45.24	134.85	168.61	573.77	17.22
2.	Medium grazing	840.25	248.80	277.64	370.95	1737.64	52.15
3.	Light grazing	397.62	60.31	158.65	219.20	835.70	25.09
4.	No grazing	75.02	-	23.60	-	98.82	2.97
5.	Unrecorded	7.50	22.62	55.62	-	85.64	2.57
	Total	1545.46	376.97	650.46	758.76	3331.65	100.00

4.1.6 Distribution of accessible forest area by plantation potential

In 31.15 percent (1037.83 km^2) area there is scope for afforestation or augmenting stocking by enrichment plantations to increase site productivity. In 7.06 percent area (235.4 km^2) assessed as unplantable, soil conservation measures to conserve and build up soil may be necessary. Districtwise distribution of area by plantation potential is given in table No. IV.1.6.

Table No. IV.1.6

Distribution of accessible forest area by plantation potential and districts

Total sample plots = 428
Total area = 3331.65
Area unit - km^2

Plantation potential	Districts				Total	%
	Udhampur	Jammu	Kathua	Rajouri		
Plantable	375.11	203.56	206.24	252.92	1037.83	31.15
Unplantable	90.03	7.54	87.25	50.58	235.40	7.06
Not applicable	1065.32	143.25	309.37	455.26	1973.20	59.22
Unrecorded	15.00	22.62	47.60	-	85.22	2.57
Total	1545.46	376.97	650.46	758.76	3331.65	100.0

Explanatory note:

Plantation potential was assessed only at those sample plots having tree crown cover density of less than 30%. Plantable/unplantable potential was determined by giving due consideration to aspect, soil depth, drainage, crop in surrounding area and other biotic and climatic factors. The maximum permissible slope upto which plantation can be raised was kept as 40° and minimum soil depth 20 cms. Sample plots having crown density of 30% or more were categorised as not applicable since plantation potential of such area from the point of view of afforestation is not of any significance.

Contents

4.1.7 Distribution of accessible forest area by fire incidence classes:

Area generally does not experience heavy and frequent fires. However occasional fires occur in 32.70 percent (1089.58 km^2) of the area. Uncontrolled fires damage flora and fauna. Hence in fire susceptible areas, preventive measures to minimise fire damages need greater attention. Districtwise distribution of forest area by fire incidence classes is given in Table No. IV.1.7.

Table No. IV.1.7

Distribution of accessible forest area by fire incidence classes and districts

Total sample plots=428
Total area= 3331.65 km^2
Area unit = km^2

Fire incidence	Districts				Total	%
	Udhampur	Jammu	Kathua	Rajouri		
Very heavy	7.50	-	-	-	7.50	0.23
Frequent	45.01	-	15.87	-	60.88	1.83
Occasional	480.15	75.39	222.11	311.93	1089.58	32.70
No fire	1005.30	278.96	356.96	446.83	2088.05	62.67
Unrecorded	7.50	22.62	55.52	-	85.64	2.57
Total	1545.46	376.97	650.46	758.76	3331.65	100.00

Contents

4.1.8 Distribution of accessible tree forest area by size classes

Maximum area i.e. 56.52 percent (1803.56 km^2) has big timber followed by 24.11 percent (769.26 km^2) under small timber, 13.59 percent (433.67 km^2) under pole crop, 5.08 percent (162.13 km^2) under mixed size classes and minimum 0.47 percent (15.08 km^2) under regeneration crop. Districtwise distribution of area by size classes is given in table No. IV.1.8.

Table No. IV.1.8

Distribution of accessible tree forest area by size class and districts.

Total sample points: 410
Total area : 3191.20
Area unit : km^2

Size class	Districts				Total	%
	Udhampur	Jammu	Kathua	Rajouri		
Regeneration	-	15.08	-	-	15.08	0.47
Pole crop	157.55	105.55	103.12	67.45	433.67	13.59
Small timber	412.63	45.23	142.79	168.61	769.26	24.11
Big timber	885.26	143.25	277.64	497.41	1803.56	56.52
Mixed size class	67.52	30.16	47.59	16.86	162.13	5.08
Unrecorded	7.50	-	-	-	7.50	0.23
Total	1530.46	339.27	571.14	750.33	3191.20	100.0

Explanatory note:

Regeneration: i.e. crop below 10 cms diameter predominating.

Pole crop: Crop between 10 to less than 20 cms diameter predominating.

Small timber: Crop 20 cms to under 30 cms diameter predominating

Big timber: Trees with diameter 30 cms and over predominating.

Mixed size: class Tree crop with no marked domination of any size class.

Contents

4.1.9 Distribution of accessible tree forest area by regeneration status

Natural regeneration is practically absent in the area. It is completly absent over 83.93 percent of the area and inadequate over 7.57 percent indicating a situation of alarm. Greater attention is needed to induce regeneration in such areas. Districtwise distribution of accessible tree forest area by regeneration status is given in Table No. IV.1.9.

Table No. IV.1.9

Distribution of accessible tree forest area by regeneration status and districts:

Total sample points: 410
Total area: 3191.20
Area unit : km^2

Reneneration status	Districts					
	Udhampur	Jammu	Kathua	Rajouri	Total	%
Adequate	22.51	-	7.93	-	30.44	0.95
Inadequate	105.03	15.08	79.33	42.15	241.59	7.57
Absent (No regeneration)	1282.88	324.19	396.62	674.46	2678.15	83.93
Unrecorded (regeneration plot could not be laid out because of difficult terrain)	120.04	-	87.26	33.72	241.02	7.55
Total	1530.46	339.27	571.14	750.33	3191.20	100.00

Explanatory note:

Adequate regeneration: Means where 8 or more than 8 seedlings (having diameter between 2 to less than 10 cms at breast height), of economically important species were found in a regeneration plot of 16 sq.metre area.

Inadequate regeneration: Means where less than 8 seedlings (having diameter between 2 to less than 10 cms at breast height), of economically important species were found in a regeneration plot of 16 sq.metre area.

Contents

4.1.10 Distribution of access[illegible] tree forest area by i[illegible] crop

30.16 percent (962.46 km^2 of the area is subjected to manmade injuries, 4.30 percent (137.23 km^2) to natural injuries and the remaining area is free of injuries. Injuries to forest crop reduce value of timber produced, retards its growth and at times lead to mortality. More attention is needed to minimise injuries to forest crop to optimise the return from such areas. Districtwise distribution of accessible tree forest area by injury type is given in Table No. IV.1.10.

Table No. IV.1.10

Distribution of accessible tree forest area by type of injury to crop [illegible] districts

Total sample points : 410
Total area : 3191.20
Area unit: km^2

Injury	Districts				Total	%
	Udhampur	Jammu	Kathua	Rajouri		
Natural	90.03	7.54	39.66	-	137.23	4.30
Manmade/ Un-natural	352.61	143.25	222.11	244.49	962.46	30.16
Absent	1087.82	188.48	293.50	505.84	2075.64	65.04
Unrecorded	-	-	15.87	-	15.87	0.50
Total:	1530.46	339.27	571.14	750.33	3191.20	100.00

Explanatory note:

Injury was judged by occular estimation in 2 ha. area around the centre of plot provided the effected trees formed at least 10% of the crop.

Natural Injury: Means injury by wind/snow or flood, climber, lightening, wildlife borer attack, leaf defoliator or other pests

Manmade/Un-natural Injury by girdling/illicit felling, scarring/fire, lopping.

4.1.11 Distribution of accessible tree forest area by degradation status of forest:

15.53 percent (495.55 km^2) of area is moderately to heavily degraded while rest of the area is either mildly degraded or not degraded. Production from degraded areas is low and at the same time they are more susceptible to erosion, degrading them further. Such areas need greater attention for their rehabilitation. Districtwise distribution of accessible tree forest area by degradation status of forest is given in Table No. IV.1.11.

Table No. IV.1.11

Distribution of accessible tree forest area by status of forest and districts

Total sample points: 410
Total area: 3191.20
Area unit : km^2

Status of forest	Districts				Total	%
	Udhampur	Jammu	Kathua	Rajouri		
Heavily degraded	37.51	37.70	23.80	59.02	158.03	4.95
Moderately degraded	127.54	52.78	47.60	109.60	337.52	10.58
Mildly degraded	172.5	75.39	134.84	50.58	433.37	13.58
Not degraded	1147.84	173.40	349.03	531.13	2201.40	68.98
Unrecorded	45.01	-	15.87	-	60.88	1.91
Total	1530.46	339.27	571.14	750.33	3191.20	100.00

Explanatory note:

The status of forest crop was judged by occular estimation depending upon its healthy/vigour which in turn is influenced by extent of biotic adverse factors like grazing, fire, lopping, illicit felling and other natural calamities, pests effecting health/mortality in the crop.

Contents

4.1.12 Distribution of accessible tree forest area by forest types

Chir has most extensive distribution in the region covering 40 percent (1276.52 km^2) area followed by 14.60 percent (465.99 km^2) under upland hardwoods, 14.29 percent (455.96 km^2) under miscellaneous forest, 9.93 percent (316.79 km^2) under hardwoods mixed with conifers, 6.12 percent (195.41 km^2) under fir, 3.36 percent (107.19 km^2) under deodar, 3.33 percent (106.33 km^2) under spruce, 2.39 percent (76.30 km^2) under fir/spruce, 2.35 percent (75.02 km^2) under blue pine, 1.98 percent (63.17 km^2) under khair and 1.65 percent (52.52 km^2) under mixed conifers type of forests. Districtwise distribution of area by forest types is given in table No. IV.1.12. Map based on field inventory showing occurence of various forest types in the region is given at page 33.

Table No. IV.1.12

Distribution of accessible tree forest area by forest types and districts

Total sample point = 410
Total area = 3191.20
Area unit = km^2

Forest types	Districts				Total	%
	Udhampur	Jammu	Kathua	Rajouri		
Fir	120.04	-	7.93	67.44	195.41	6.12
Spruce	82.53	-	23.80	-	106.33	3.33
Fir-spruce	52.51	-	23.79	-	76.30	2.39
Blue-pine	75.0[illegible]	-	-	-	75.02	2.35
Deodar	67.52	-	39.67	-	107.19	3.36
Chir	495.16	211.10	182.45	387.81	1276.52	40.00
Mixed conifers	52.51	-	-	-	52.52	1.65
Hardwoods mixed with conifers	187.50	22.62	47.60	59.01	316.79	9[illegible]
Upland hardwood	217.55	-	71.39	177.05	465.99	14.60
Khair forest	-	15.08	39.66	8.43	63.17	1.98
Misc. forest	180.05	90.47	134.85	50.59	455.96	14.29
Total	1530.46	339.27	571.14	750.33	3191.20	100.00

Explanatory note:

Species comprising more than 50% of crop was recognised as pure for st type of that species. Hardwood mixed with conifers was the type in which conifers, broad leaved species occur in more or less in same proportions.

Contents

4.1.13 Distribution of accessible tree forest area by forest type and canopy density classes

15.25 percent (486.62 km^2) of accessible tree forest area has canopy density greater than 70 percent, 46.83 percent (1494.47 km^2) has canopy density of 30 to 69 percent while remaining 37.92 percent (1210.11 km^2) has canopy density of 5 to 29 percent. Thus 15.25% of area with canopy cover greater than 70 percent is under good forests, 46.83 percent area with canopy cover of 30 to 69 percent is open and of medium stocking while remaining 37.92 percent area having canopy cover of less than 30 is very open and has low productivity. Open areas are also susceptible to soil erosion thus further reducing their productivity. Therefore, greater attention is needed to augment stocking in open areas by enrichment planting.

Distribution of accessible tree forest area by forest type, canopy density and districts is given in table No. IV.1.13. From this table, it is observed that overall canopy density in the region is 42 percent thereby indicating about 60 percent area to be without tree cover. Though some percentage of this open area may not be suitable for tree growth due to rockiness, less soil depth and other unfavourable factors, nevertheless on major portionof same, there is scope to increase the stocking.

Contents

Table No. IV.1.13

Distribution of accessible tree forest area by forest types, canopy density classes and districts

Total sample points = 410
Total area = 3191.20
Area unit = km^2

Forest types	Udhampur			Jammu			Kathua		
	70 % & above	30% to 69%	5% to 29%	70 % & above	30% to 60%	5% to 29%	70 % & above	30% to 69%	5% to 29%
1	2	3	4	5	6	7	8	9	10
Fir	15.01	67.52	37.51	-	-	-	-	7.93	-
Spruce	15.01	67.52	-	-	-	-	-	15.87	7.93
Fir-spruce	7.50	37.51	7.50	-	-	-	7.93	7.93	7.93
Blue pine	7.50	45.01	22.51	-	-	-	-	-	-
Deodar	37.51	30.01	-	-	-	-	31.74	7.93	-
Chir	37.51	330.10	127.55	7.54	113.09	90.47	7.93	126.92	47.60
Mixed conifers	15.01	7.50	30.01	-	-	-	-	-	-
Hardwood mixed with conifers	22.51	112.54	52.51	-	15.08	7.54	-	15.87	31.73
Upland hardwood	45.00	105.03	67.52	-	-	-	31.73	7.93	31.73
Khair forest	-	-	-	-	-	15.08	-	7.93	31.73
Misc. forest	37.51	30.01	112.53	-	-	90.47	7.93	31.73	95.19
Total	240.07	832.75	457.64	7.54	128.17	203.56	87.26	230.04	253.84
% of total	7.52	26.09	14.34	0.24	4.02	6.38	2.73	7.21	7.95

Table continued

Contents

Forest types	Districts Rajouri 70 % & above	Rajouri 30% to 69%	Rajouri 5% to 29%	Total 70% & above	Total 30% to 69%	Total 5% to 29%	Grand Total	Overall density percent
	11	12	13	14	15	16	17	18
Fir	25.29	16.86	25.29	40.30	92.31	62.80	195.41	46
Spruce	-	-	-	15.01	83.39	7.93	106.33	52
Fir-spruce	-	-	-	15.43	45.44	15.43	76.30	50
Blue pine	-	-	-	7.50	45.01	22.51	75.02	43
Deodar	-	-	-	69.25	37.94	-	107.19	72
Chir	50.59	202.34	134.88	103.57	772.45	400.50	1276.52	42
Mixed conifers	-	-	-	15.01	7.50	30.01	52.52	41
Hardwood mixed with conifers	8.43	25.29	25.29	30.94	168.78	117.07	316.79	41
Upland hardwood	59.01	59.02	59.02	135.74	171.98	158.27	465.99	48
Khair forest	-	-	8.43	-	7.93	55.24	63.17	21
Misc. forest	8.43	-	42.16	53.87	61.74	340.35	455.96	30
Total	151.75	303.51	295.07	486.62	1494.47	1210.11	3191.20	42
% of total	4.76	9.51	9.25	15.25	46.83	37.92	100	

Contents

4.2 Stand and stock tables

Distribution of volume per hectare (stock table) and stems per hectare (Stand table) by species and diameter classes in accessible tree forest area of the region are given forest typewise from table No. IV.2.1 to IV.2.22. In these tables, species constituting less than 1 percent of total volume have been clubbed together as 'rest of the species'. These and other tables are given at the end of this chapter. Gist of these tables is given below:-

Total vol. 32457.660

Forest Type	Total area (ha.)	Volume/ha. (m^3)	Stems/ha. 171798 vol ha
Fir	19541	293.399	94.413
Spruce	10633	302.815	240.796
Fir-spruce	7630	330.574	154.771
Kail (Blue pine)	7502	278.370	147.000
Deodar	10719	370.007	234.111
Chir	127652	103.548	128.795
Mixed conifers	5252	325.532	190.001
Hardwood mixed with conifers	31679	84.783	250.697
Upland hardwood	46599	116.267	358.328
Khair	6317	20.256	134.367
Miscellaneous Forest	45596	23.740	157.956
	98.512		

100.929

Tot vol = 6698.005 ostocu MB.

vol/ha = 67.281

4.2.1 Analysis of the growing stock in forest types and its critical aspects:

Among the various parameters of crop, that can be measured with fair accuracy, basal area (calculable from diameter at breast height overbark) is the only parameter varying least in comparison to others such as number of stems, volume per hectare, with change in age/site qualities. Attempt has been made here to analyse the stocking in current survey area with stock figures in yield table of a species most predominant in the type. Yield tables though are applicable to fully stocked regular forests (normal) where various age gradations are situated on separate areas, nevertheless data in them when compared with that of irregular forests, prevailing in current survey area where all age gradations are intermingled over entire area, can give some indications about the status of stocking position in them.

Contents

(i) Fir Forest Type:

This type occurs over 19541 hectare area with overall canopy cover of 46 percent (table No. IV.1.13). Per hectare volume in the type is 293.399 m^3 of which 83.9 percent is Abies pindrow, 11.3 percent is Abies smithiana, 2.5 percent is Quercus semicarpifolia, 0.8 percent is Pinus excelsa and remaining 1.5 percent is rest of the species (each comprising less than one percent). Per hectare stems in the type are 94 of which 75.8 percent are of Abies pindrow, 9.3 percent are Abies smithiana, 1.9 percent are Quercus semicarpifolia, 0.5 percent are Pinus excelsa and remaining 12.5 percent are rest of the species. Total Basal area per hectare is 192568 cm^2. From this and the total/dia in the type to be 51 cms. Yield tables for fir (Abies pindrow) are not available. Therefore stocking in this forest type is compared with yield table figures of Kail (Pinus excelsa) to get indication about stocking. It is presumed that fir forests of survey area belong to average quality (IInd) normal Kail forest, having average crop diameter of 50.55 cms, contain 341 stems and 980.67 m^3 volume and basal area of 68.41 m^2 per hectare whereas fir forests having crop diameter 51 cms of survey area has 94 stems, 293 m^3 volume and basal area of 19.2 m^2 per hectare. Due to constricted crown formations of fir/spruce as compared to kail, stocking in normal forests of former will be far more than the latter. The above comparison gives an indication that forests of survey area are understocked by about 70 percent as compared to normal kail forests. Overall crown density of 46 percent in the type as against 100 percent in normal forests give an indication of about 54 percent understocking. Working plans of survey area prescribe exploitable diameter of 70 cms DBH for fir/spruce working circles. On examining distribution of stems and volume in the type, it is observed that 68.7 percent of volume and 23.4 percent of stems are above 70 cms. diameter size. In a normal forest, proportion of volume in young, middle and old age classes is 1 : 3 : 5 (as per triangle of normal growing stock). As against this, proportion in the survey area is 1 : 3.7 : 40.1 (corresponding to growing stock in dia classes 10 cms to 30 cms, 30 cms to 50 cms, 50 cms and above) respectively indicating thereby that distribution is at much variance with the normal distribution with preponderance of old age classes.

(ii) Spruce forest type:

This type occurs over 10633 hectare of area with overall canopy density of 52 percent (table No. IV.1.13). Per hectare volume in the type is

/ number of stems per hectare we deduce average crop

302 m^3 of which 81.7 percent is of Abies smithiana, 8.3 percent is Cedrus deodara, 3.9 percent is Pinus excelsa, 2.9 percent is Abies pindrow, 1.6 percent is Quercus semicarpifolia and remaining 1.6 percent comprise of rest of the species. Per hactare stems in the type are 240 of which 79.5 percent are of Abies smithiana, 4.4 percent of Abies pindrow, 3.9 percent of Cedrus deodara, 2.9 percent of Pinus excelsa, 0.6 percent of Quercus semicarpifolia and remaining 8.7 percent comprise of rest of species. Total basal area per hectare in the type is 257199 cm^2 from which average crop diameter deduced is 36.9 cms based on 240 stems per hactare. No yield tables are available for spruce and hence stocking in this type is compared with those of normal forests of kail for which yield tables are available. It is presumed that spruce forests of survey area belong to average (IInd) quality. Normal kail forest of average quality (IInd) having average crop diameter of 37.59 cms contain 467 stems, 618.9 m^3 volume and 51.88 m^2 basal area per hectare, whereas in survey area these are 240 stems, 302 m^3 and 25.71 m^2 respectively for average crop diameter of 36.9 cms. The above comparisons indicate that forests in survey area are understocked by about 50 percent as compared to normal forests. Overall canopy density of 52 percent assessed in the type also give same inference. Exploitable diameter of spruce in the survey area is 70 cms. On examination of distribution of volume in various diameter classes, it is observed that proportion of volume in young, middle and old classes (corresponding to those in diameter classes 10 to 30 cms, 30 to 50 cms, 50 cms and above) are 1, 4.3 and 5.5 respectively as against 1 : 3 : 5 in a normal forest. This indicates that distribution is not normal. Younger classes are deficient while middle and old classes are proportionately higher.

(iii) <u>Fir-spruce forest type</u>

This type occurs over 7630 hectare of area with overall canopy density of 50 percent (table No. Iv.1.13). Per hectare volume in the type is 330 m^3 of which 66.4 percent is Abies pindrow, 31.4 percent is Abies smithiana, 2.1 percent is Quercus semicarpifolia and 0.1 percent comprise of rest of the species. Per hectare stems in the type are 154 of which 48.3 percent are Abies pindrow, 39.7 percent are Abies smithiana, 10 percent are Quercus semicarpifolia and remaining 2 percent comprise of rest of the species. Total basal area per hectare is 225706 cm^2 from which average crop diameter deduced comes to 43 cms based on 154 stems per hectare in the type. It is presumed that fir/spruce forests of survey area belong to average quality (IInd). Normal kail forest of IInd

Contents

quality at crop diameter of 42.67 cms has basal area of 58.54 m^2, 410 stems and 744.85 m^3 volume per hectare whereas in survey area forest with average crop diameter of 43 cms has basal area of 22.57 m^2, 154 stems and 330 m^3 volume per hectare. Above comparison gives an indication that forests in survey area are understocked by about 60 percent compared to normal forests. Overall canopy density assessed in the type is 50 percent which indicates understocking of about 50 percent. Exploitable diameter for fir/spruce in the survey area is 70 cms. Proportion of volume in young, middle and old classes (corresponding to diameter classes 10 to 30 cms, 30 to 50 cms, 50 cms and above) is 1 : 1.4 : 16.1 as against 1 : 3 : 5 in a normal forest. Thus distribution of the volume is abnormal with preponderance of old age classes.

(iv) Blue pine forest type:

This type occurs over 7502 hectare with overall canopy density of 43 percent (table No. IV.1.13). Per hectare volume in the type is 278 m^3 of which 92.9 percent is of Pinus excelsa, 3.1 percent of Quercus incana, 1.9 percent of Pinus roxburghii and remaining 2.1 percent comprise of rest of the species. Per hectare stems in the type are 147 of which 80.3 percent are of Pinus excelsa, 12.9 percent of Quercus incana, 0.7 percent of Pinus roxburghii and remaining 6.1 percent comprise of rest of the species. Basal area per hectare is 231844 cm^2 and average crop diameter as deduced therefrom is 44.8 cms based on 147 stems. Quality of crop in the survey area is presumed to be medium (IInd quality). IInd quality normal kail forest crop having average crop diameter of 46.23 cms (as per yield table) contain 378 stems, 857.15 m^3 volume and 63.59 m^2 basal area per hectare as against which kail forest in survey area has 147 stems, 278 m^3 volume and 23.18 m^2 basal area per hectare with average crop diameter of 44.8 cms. This comparison suggest that forests of survey area are understocked by about 65 percent when compared with normal forest. Overall canopy density of 43 percent assessed in the type during inventory indicate understocking to the extent of about 57 percent. Exploitable diameter fixed for kail working circle in survey area is 70 cms. Proportion of young, middle and old volume (corresponding to diameter classes 10 to 30 cms, 30 to 50 cms, and 50 cms and above) is 1 : 4.1 : 10.7 as against 1 : 3 : 5 in a normal forest. The distribution is abnormal with high proportion of old age classes or in other words deficient in younger and middle age classes.

Contents

(v) Deodar forest type

This type occurs over 10719 hectare area with overall canopy density of 72 percent (table No. IV.1.13). Per hectare volume in the type is 370 m^3 of which 85.7 percent is of Cedrus deodara, 10.1 percent is of Abies smithiana, 2.3 percent is of Quercus incana, .7 percent is of Machilus species and .4 percent each of Pinus excelsa, Rhododendron areboreum, rest of the species. Per hectare stems are 234 of which 80.6 percent are of Cedrus deodara, 7.4 percent are of Abies smithiana, 2.7 percent of Machilus species, 1.6 percent of Quercus incana, 0.7 percent of Pinus excelsa, 0.3 percent are of Rhododendron areboreum and remaining 6.7 percent comprise of rest of the species. The type has 283635 cm^2 basal area per hectare from which deduced average crop diameter comes . 39.3 cms basing on 234 stems. Deodar forests of survey area are presumed to belong to medium quality (IInd). Hence comparison of stocking has been made with normal forest of IInd quality deodar. IInd quality normal deodar forest having average crop diameter as 40.39 cms, has basal area 72.08 m^2, 563 stems and 873.25 m^3 volume per hectare as per yield table against which crop in survey area has 28.36 m^2 basal area, 234 stems and 370 m^3 volume per hectare for average crop diameter of 39.2 cms. Above conparison give an indication that forests of survey area are understocked by about 60 percent when compared with normal forest. Overall canopy density of 72 percent as assessed during inventory indicate understocking of about 30 percent. Exploitable diameter in deodar working circle of survey area is 70 cms. In normal distribution, proportion of young, middle and old volume is 1 : 3 : 5 against which proportion of young, middle and old volume (corresponding to diameter class 10 to 30 cms, 30 to 50 cms, 50 cms and above) in the survey area is 1 : 2.1 : 8.1 respectively. 35 percent of the volume in the type is overmature (over 70 cms DBH). Thus distribution of volume in the type is not normal i.e. lower diameter classes are deficient while old classes contain proportionately higher volume.

(vi) Chir forest type

This type is most extensively distributed over 127652 hectares of the survey area with overall canopy density of 42 percent. Volume per hectare in the type is 103 m^3 of which 94.5 percent is of Pinus roxburghii. Stems per hectare are 128 of which 80.8 percent are of Pinus roxburghii, 4.6 percent are of Quercus incana and the remaining comprise of other species. Basal area of the crop is 114532 cm^2 per hectare from which deduced average crop diameter comes to 33.6 cms based

Contents

on 128 stems per hectare. Chir forests of survey area are presumed to belong to average quality (IInd). IInd quality normal chir forest having average crop diameter of 35.56 cms has 282 stems, 315.57 m^3 volume and 28.01 m^2 basal area per hectare as per yield table against which survey area with average crop diameter of 33.6 cms has 128 stems, 103 m^3 volume and 11.45 m^2 basal area per hectare. Above comparison gives indication that forests of survey area are understocked by about 60 percent when compared with normal forest. Overall canopy density of the crop as assessed during inventory is 42 percent which points almost same extent of understocking. Exploitable diameter for chir working circle in the survey area is 60 cms. Proportion of volume in young, middle and old classes (corresponding to diameter classes 10 to 20 cms, 20 to 40 cms, 40 cms and above) in the survey area is 1 : 7.7 : 19.8 respectively as against 1 : 3 : 5 in a normal forest. 23.9 percent volume in the type is overmature (over 60 cms DBH). Above indicates that distribution of stems in various diameter classes is not normal. Younger classes are deficient while middle and old classes in relation to younger classes have proportionately more volume.

(vii) Mixed conifer forest type

This type occurs over 5252 hectare with overall canopy cover of 41 percent (table No. IV.1.13). Per hectare volume in the type is 325 m^3 of which 41.9 percent is of Pinus excelsa, 22.8 percent of Abies pindrow, 13.6 percent of Cedrus deodara, 6.8 percent of Abies smithiana and balance consist of other species. Stems per hectare in the type are 190 of which 28.9 percent are of Cedrus deodara, 27.2 percent of Pinus excelsa, 22.8 percent of Abies smithiana, 7 percent are of Abies pindrow and balance are of other species. Basal area per hectare is 264327 cm^2 from which deduced average crop diameter comes to 42 cms based on 190 stems per hectare in the type. Since none of the single species constitute more than 50 percent of volume or stems, comparison of stocking with yield table figures of any one species is not possible. However overall canopy density of 41 percent in the type assessed during inventory indicates that forests are understocked by about 59 percent.

(viii) Hardwood mixed with Conifers type

This type occurs over 31679 hectare area with overall density of 41 percent. Per hectare volume in the type is 84 m^3 of which 25 percent is of Pinus roxburghii followed by 22.2 percent of Quercus incana, 10.2 percent of Abies pindrow, 7.7 percent of Pinus excelsa, 5.6 percent each of Cedrus deodara and Quercus semicarpifolia, 2.6 percent of Lannea coromandelica,

Contents

2 percent of Buxus wallichiana and balance 19.1 percent comprise of other species. The type has 250 stems per hectare of which 19.9 percent are of Quercus incana followed by 9.9 percent of Buxus wallichiana, 6.9 percent of Pinus roxburghii, 6.8 percent of Quercus semicarpifolia, 3.8 percent each of Acacia catechu, Lannea coromandelica, 2 percent of Cedrus deodara, and the balance 46.9 percent consist of other species. Basal area per hectare of the crop is 117600 cm^2 from which deduced average crop diameter comes to 24 cms based on 250 stems per hectare in the type. 84 percent of the stems and 26 percent of the volume are below 30 cms DBH. The overall canopy cover of 41 percent assessed during inventory points to the understocking of crop by about 59 percent as against normal forest (canopy coverage approaching 100 percent).

(ix) Upland hardwood forest type

The type occurs over 46599 hectare area with overall canopy cover of 48 percent. Per hectare volume in the type is 116 m^3 of which 67.8 percent is of Quercus incana, 11.2 percent of Quercus semicarpifolia, 5.1 percent of Rhododendron arboreum, 4.2 percent of Machilus species, 1.4 percent of Abies smithiana and balance 10.3 percent consists of other species. The forest type has 358 stems per hectare of which 64.2 percent are of Quercus incana, 9.6 percent of Quercus semicarpifolia, 6.2 percent of Rhododendron arboreum, 6.1 percent of Machilus species, 1.8 percent of Buxus wallichiana and balance 12.1 percent consist of other species. Basal area per hectare of crop is 180117 cm^2 from which deduced average crop diameter comes to 25.3 cms based on 358 stems per hectare in the type. It is presumed that survey area has average quality crop of Quercus incana (most predominent species in the type). Average quality Quercus incana crop having average crop diameter of 22.86 cms has 709 stems, 246.3 m^3 volume and basal area of 26.16 m^2 per hectare as per yield table, against which the forest type in survey area has 398 stems 116 m^3 volume and basal area of 18.01 m^2 per hectare for a crop of 25.3 cms average diameter. Above comparison give indication that crop in survey area is understocked by about 35 percent as compared to normal forests. Overall canopy cover of 48 percent assessed during inventory indicate understocking to the extent of 52 percent.

(x) Khair forest type

This type occurs over 6317 hectare area and the crop has overall canopy cover of 21 percent only. The type has 20 m^3 volume per hectare of which 59.2 percent is of Pinus roxburghii, 20.5 percent is of Acacia catechu 7.6 percent is of Lannea coromandelica and Balance 12.7 percent consists of other species. The type has 134 stems per hectare of which 56.1 percent are of Acacia catechu, 21.5 percent of Lannea coromandelica,

Contents

2.9 percent of Pinus roxburghii and the balance 19.5 percent consists of other species. Basal area per hectare in the type is 40028 cm^2 from which average crop diameter deduced is 19.5 cms based on 134 stems per hectare. 26.2 percent of volume and 87.8 percent of stems are below 20 cms DBH (exploitable diameter prescribed for khair in working plans of survey area) and thus crop on the whole is young. Overall canopy cover of 21 percent assessed during inventory in the type indicates understocking to the tune of 79 percent.

(xi) Miscellaneous forest type

The type occurs over 45596 hectare of area and the crop has overall canopy cover of 30 percent. Per hectare volume in the type is 23 m^3 of which 33.2 percent is of Quercus incana, 14.8 percent of Lannea coromandelica, 8.5 percent of Pinus roxburghii, 1.8 percent of Acacia catechu and balance 41.7 percent consists of other species. The type has 157 stems per hectare of which 18.6 percent are of Quercus incana, 10.9 percent are of Lannea coromandelica, 6.6 percent are of Acacia catechu and balance 63.9 percent consists of other species. The crop has 47168 cm^2 basal area per hectare from which average crop diameter deduced comes to 19.5 cms based on 157 stems per hectare in the type. 60 percent of volume and 94.5 percent of stems are below 30 cms diameter at breast height and hence crop on the whole is young. Overall canopy cover of 30 percent as assessed during inventory points that crop in the area is understocked by about 70 percent.

Data in stand, stock tables and foregoing analysis of same indicates that crop in various forest types is understocked to varying degree when compared with ideal normal stocking. Overall canopy density of crop varies from 21 percent in Khair type to 72 percent in Deodar forest type. Overall canopy cover in the area is about 42 percent (table No. IV.1.13). Open forests are less productive as well as more susceptible to soil erosion thus leading to further degradation of site. Such forests cannot afford full protection to area and maintain ecological balance. Hence greater attention is needed in future to such open areas to improve production, their productivity and to check their further degradation.

Contents

4.2.2 Analysis of growing stock in districts

The volume per hectare and stems per hectare by species and diameter classes in accessible tree forest area, districtwise is given in table No. IV.2.23 to IV.2.30. These tables are given at the end of this chapter. Gist of these tables is given below:-

District	Area (ha.)	Volume/ha	Stems/ha
Udhampur	153046	163.76	205.58
Jammu	33927	58.89	76.43
Kathua	57114	127.30	223.47
Rajouri	75033	98.96	166.40
	319120	130.904	

From the above it is observed that volume per hectare varies from 58.89 m^3 per hectare in Jammu district to 163.76 m^3 in Udhampur district. Number of stems varies from 76.43 per hectare in Jammu district to 223.47 stems in Kathua district.

Whole accessible tree forest area has total growing stock of 41.773 million cubic metre and 59.327 stems. Per hectare volume and stems in the area is 130.904 m^3 and 185.907 stems respectively. Their distribution by species and diameter are given in table No. IV.2.31 to IV.2.34.

4.3 Sampling error

Standard error percent of volume per hectare, forest type wise is given below:

Forest type	S.E. percent
Fir	31.9 (20)
Spruce	33.1 (13)
Fir/Spruce	66.5 (7)
Blue pine	43.2 (10)
Deodar	43.5 (13)
Chir	8.9 (154)
Mixed conifers	44.9 (6)
Hardwood mixed with conifers	24.0 (35)

Contents

Forest type	S.E. percent
Upland hardwoods	18.1 (53)
Khair	62.8 (6)
Miscellaneous forest	25.6 (51)

Figures in bracket are the number of sample plots on which volumes were estimated. The standard error percent of volume per hectare in various districts are as under:

District	S.E. percent
Jammu	26.5 (43)
Udhampur	12.2 (182)
Kathua	24.4 (58)
Rajouri	14.4 (85)
Overall districts	8.9 (368)

This being a very low intensity survey, standard error for smaller reporting units like district, forest type is quite high. Hence the report has been prepared for the region at which level error of results is comparatively low.

Contents

4.4 Household fuel consumption in the survey area

Information on the quantity and pattern of fuel consumption in rural households of the survey area was also collected while doing the main forest inventory works. This information was collected by direct enquiry method from four representative households of each village near to camping places. The information so collected was compiled and is given in table No.IV.4.1. Consumption pattern as far as extent of fuelwood removed from forest is concerned may vary depending upon distance of village from the nearest forest. The information gives indication about the rural fuelwood consumption in the vicinity of forests.

From the table, if is seen that on the average, per capita per year fuelwood/agricultural waste consumption is 1043 kgs of which 747 kgs. comes from trees, 255 kgs. from brushwood and 41 kgs from agricultural wastes. Survey further revealed that, of the 747 kgs coming from trees, 80 percent comes from Government forests and 20 percent from private lands. Energy requirement of rural population are met entirely from fuelwood/agricultural waste. Kerosene oil, the only commercial fuel consumed is utilised for lighting purpose.

Contents

Table No. IV.4.1

HOUSEHOLD FUEL CONSUMPTION IN JAMMU REGION (KATHUA, JAMMU, UDHAMPUR & RAJAURI DISTRICTS)

Sl. No.	District	No. of house-hold sampled	Total family members	Nature of fuel consumed per capita per annum								K.oil in ltr
				From trees			From bush wood			Agriculture waste in kgs 100% (from private land)	Total of cols. 5,8,11 in kgs	
				Total kgs.	% from Govt. forests	% from private land	Total kgs.	% from Govt. forests	% from private land			
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Kathua	44	408	745	94	6	183	56	44	102	1030	4.76
2.	Udhampur	100	855	871	77	23	179	62	38	12	1062	3.17
3.	Rajauri	28	216	411	64	36	588	42	58	68	1067	5.44
4.	Jammu	20	153	532	77	23	403	61	39	5	940	2.54
	Total:-	192	1632	2559	312	88	1353	221	179	187	4099	15.91
	Per capita consumption in survey area	-	-	747	80	20	225	55	45	41	1043	3.80

Note :- The above data was collected only in rural areas to which this consumption pattern applies. Study has further reveal that other sources of energy viz Charcoal, mineral coal, cooking gas, electricity, cowdung are not used as fuels in these areas.

Contents

Table No. IV.4.1

Distribution of volume by species and diameter classes in accessible tree forest area

Forest type : Fir
Unit : m^3 (r)
Area : 19541 ha.

S. No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	3.063	2.221	5.803	12.847	24.315	29.105	42.[illegible]61	126.[illegible]74	2[illegible]6.[illegible]3	[illegible]3.[illegible]
2.	Abies spectabilis	0.440	-	0.951	2.812	1.201	-	3.764	23.[illegible]33	33.[illegible]	11.3
3.	[illegible] excelsa	-	-	-	-	-	2.324	-	-	2.324	[illegible]
4.	[illegible] semicrenifolia	-	-	-	-	2.136	-	-	5.191	7.327	2.5
5.	[illegible] of species*	0.463	0.344	0.480	1.499	1.512	-	-	-	4.298	[illegible].5
	Total	3.966	2.565	7.234	17.158	29.164	31.489	45.825	155.998	293.[illegible]	
	%	(1.3)	(0.9)	(2.4)	(6.0)	(10.0)	(10.7)	(15.5)	(53.2)		100

* [illegible] of the species include- Juglans regia, Aesculus indica and Miscellaneous species.

Contents

Table No. IV.2.2

Distribution of stems per hectare by species and dia classes in accessible tree forest area

Forest type : Fir
Unit : No. of stems
Area : 19541 ha.

S.No.	Name of species	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	21.070	4.633	5.342	6.081	8.238	6.923	7.293	11.952	71.532	75.8
2.	Abies smithiana	3.925	-	0.812	1.454	0.473	-	0.575	1.520	8.759	9.3
3.	Pinus excelsa	-	-	-	-	-	0.473	-	-	0.473	0.5
4.	Quercus semecarpifolia	-	-	-	-	0.981	-	-	0.812	1.793	1.9
5.	Rest of species	7.027	1.418	0.946	1.520	0.945	-	-	-	11.856	12.5
	Total:	32.022	6.051	7.100	9.055	10.637	7.396	7.868	14.284	94.413	
	%	(33.9)	(6.4)	(7.6)	(9.6)	(11.3)	(7.8)	(8.3)	(15.1)		100
	Basal area (cm^2)	5661	2971	6834	14407	22282	24552	34774	81087	192568	

Drop di = 5 cms

Contents

Table No. IV.2.3

Distribution of volume by species and diameter classes in accessible tree forest area

Forest type : Spruce
Unit : m^3 (r)
Area : 10633 ha.

S. No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	1.133	0.822	-	-	2.183	-	4.498	-	8.636	2.9
2.	Abies smithiana	6.872	16.568	40.030	64.764	40.691	30.692	23.546	24.095	247.258	81.7
3.	Pinus excelsa	0.572	-	1.017	1.717	4.932	3.581	-	-	11.819	3.9
4.	Quercus semicarpifolia	-	-	-	-	1.874	-	3.067	-	4.941	1.6
5.	Cedrus deodara	0.347	0.281	3.059	1.702	-	3.906	-	15.924	25.219	8.3
6.	Rest of the species*	0.853	0.884	0.632	1.558	1.015	-	-	-	4.942	1.6
	Total:	9.777	18.555	44.738	69.741	50.695	38.179	31.111	40.019	302.815	
	%	(3.3)	(6.1)	(14.8)	(23.0)	(16.7)	(12.6)	(10.3)	(13.2)		100

* Rest of the species include - Aesculus indica, Celtis australis and Miscellaneous s[illegible]

Contents

Table No. IV.2.4

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Forest type : Spruce
Unit : No. of stems
Area : 10633 ha.

S. No	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
*1.	Abies pindrow	7.492	1.552	-	-	0.776	-	0.776	-	10.596	4.4
2.	Abies smithiana	51.193	37.521	39.611	36.089	13.821	6.955	3.880	2.328	191.398	79.5
3.	Cedrus deodara	2.328	0.776	3.104	0.776	-	0.776	-	1.552	9.312	3.9
4.	Pinus excelsa	3.104	-	0.776	0.776	1.552	0.776	-	-	6.984	2.9
5.	Quercus semicarpifolia	-	-	-	-	0.776	-	0.776	-	1.552	0.6
6.	Rest of the species	13.194	3.880	1.552	1.552	0.776	-	-	-	20.954	8.7
	TOTAL :	77.311	43.729	45.043	39.193	17.701	8.507	5.432	3.880	240.796	
	%	(32.1)	(18.2)	(18.7)	(16.3)	(7.4)	(3.5)	(2.2)	(1.6)		100
	Basal area (cm^2)	13668	21474	43354	62359	42071	28240	24007	22026	257199	

Crop dia = 36.9 cms

Contents

Table No. IV.2.5

Distribution of volume per hectare by species and diameter classes in accessible tree forest a a

Forest type : Fir-spruce
Unit : m^3 (r)
Area : 7630 ha.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	5.687	5.024	1.778	-	-	7.049	47.032	152.860	219.432	66.4
2.	Abies spithiara	2.021	3.967	10.249	12.773	12.899	13.460	22.512	26.104	103.985	31.4
3.	Quercus semicarpifolia	0.9[illegible]9	-	-	-	-	5.966	-	-	6.885	[illegible]
4.	Rest of the species (Prunus cornuta and miscellaneous spp).	0.099	0.173	-	-	-	-	-	-	0.272	[illegible]
	Total :	8.72[illegible]	9.164	12.027	12.773	12.899	26.475	69.544	178.966	330.574	
	% :	(2.6)	(2.8)	(3.6)	(3.9)	(4.0)	(8.0)	(21.0)	(54.1)		100

Contents

Table No. IV.2.6

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Forest type : Fir-spruce
Unit : No. of stems
Area : 7630 ha.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	37.422	11.434	2.079	-	-	1.720	7.921	14.122	74.698	48.3
2.	Abies smithiana	22.115	8.316	10.000	6.918	4.480	3.441	3.441	2.760	61.471	39.7
3.	Quercus semicarpifolia	13.763	-	-	-	-	1.720	-	-	15.483	10.00
4.	Rest of species	2.079	1.040	-	-	-	-	-	-	3.119	2.0
	Total :	75.379	20.790	12.079	6.918	4.480	6.881	11.362	16.882	154.771	
	% :	(48.7)	(13.4)	(7.8)	(4.5)	(2.9)	(4.4)	(7.3)	(11.0)		100
	Basal area (cm^2)	13326	10209	11626	11007	10648	22842	50216	95832	225706	

Crop dia = [illegible] cms

Contents

Table No. IV.2.7

Distribution of volume per hectare by species and diameter classes in accessible tree forest area

Forest type : Blue pine
Unit : m^3 (r)
Area : 7502 ha.

S.No.	Species name	DIAMETER CLASSES (in cm) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus excelsa	1.746	11.272	24.628	44.224	63.377	57.884	23.090	32.287	258.508	92.9
2.	Pinus roxburghii	-	-	-	-	-	-	5.332	-	5.332	1.9
3.	Quercus incana	0.721	2.573	2.234	1.290	1.884	-	-	-	8.712	3.1
4.	Rest of specie *	0.790	0.527	-	-	-	-	4.501	-	5.818	2.1
	TOTAL:	3.267	14.372	26.862	45.514	65.261	57.884	32.923	32.287	278.370	
	% :	1.20	5.1	9.6	16.4	23.4	20.9	11.8	11.6		100

* Rest of the species include- Lyonia ovalifolia, Quercus dilatata and Miscellaneous species.

Contents

Table No. IV.2.8

Distribution stems per hectare by species and diameter classes in accessible tree forest area.

Forest type : Blue pine.

Unit : No. of stems

Area : 7502 hectare.

S. No.	Species name	DIAMETER IN CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus excelsa	9.000	20.000	22.000	24.000	21.000	14.000	4.000	4.000	118.000	80.3
2.	Pinus roxburghii	-	-	-	-	-	-	1.000		1.000	0.7
3.	Quercus incana	5.000	9.000	3.000	1.000	1.000	-	-	-	19.000	12.9
4.	Rest of the species	2.000	6.000	-	-	-	-	1.000	-	9.000	6.1
	Total:-	16.000	35.000	25.000	25.000	22.000	14.000	6.000	4.000	147.000	
	%	10.9	23.8	17.0	17.0	15.0	9.5	4.1	2.7		100
	Basal area (cm^2)	2829	17187	24062	39777	52289	46475	26518	22707	231844	

Crop dia = 41.8 cms.

Contents

Table No. IV.2.9

Distribution of volume per hectare by species and diameter classes in accessible tree forest area

Forest type : Deo[illegible]

Unit : [illegible]

Area : 10719 hectare.

No.	Species Name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
	Abies smithiana	0.870	2.057	2.591	3.359	-	6.251	5.132	17.053	37.313	10.1
	Cedrus deodara	10.672	16.925	28.690	30.972	51.219	76.323	22.915	79.303	317.019	85.7
	Quercus spp.	-	0.372	1.703	0.631	-	-	-	-	2.706	0.7
	Pinus excelsa	-	0.519	0.857	-	-	-	-	-	1.376	0.4
	Pinus inc[illegible]	0.060	0.308	-	1.005	-	1.976	-	5.192	8.541	2.3
	Rhododendron arboreum	-	-	-	-	1.356	-	-	-	1.356	0.[illegible]
	Rest of the species (Pinus nitida and misc. spp.)	0.848	0.172	0.672	0.004	-	-	-	-	1.696	0.4
	Total:-	12.450	20.353	34.513	35.971	52.575	84.550	28.047	101.548	370.007	
	%	3.4	5.5	9.4	9.7	14.2	22.8	7.6	27.4		100

Contents

Tabl No. IV.2.10

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Forest type: Deodar

Unit: No. of stems.

Area: 10719 hectare.

S.No.	Species name	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
		DIAMETER CLASS (in cm)									
1.	Abies pindrow	5.370	3.842	2.220	1.480	-	1.480	0.740	2.220	17.352	7.4
2.	Cedrus deodara	7.714	38.957	23.330	18.235	18.235	12.567	3.890	4.630	188.558	80.6
3.	Quercus species	-	2.362	3.149	0.787	-	-	-	-	6.298	2.7
4.	Pinus excelsa	-	0.787	0.787	-	-		-	-	1.574	0.7
5.	Quercus incana	0.740	0.787	-	0.740	-	0.787	-	0.787	3.841	1.6
6.	Podocarpus arborescens	-	-	-	-	0.787	-	-	-	0.787	0.3
7.	Rest of species	13.387	0.787	1.527	-	-	-	-	-	15.701	6.7
	TOTAL :	27.211	47.522	36.013	21.242	19.022	20.834	4.630	7.637	234.111	
	% :	33.0	20.3	15.4	9.1	8.1	8.4	1.9	3.3		100
	Total area (cm^2) :	13650	23337	34662	33797	42211	69161	20463	43354	283635	

Crop Dia = 39.3 cm

Contents

Table No. IV.2.11

Distribution of volume per hectare by species and diameter classes in accessible tree forest area

Forest type : C[illegible]r

Unit : [illegible] (r)

Area : 127652 ha.

S.No.	Species name	DIAMETER CLASSES (in cms)									
		10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
[illegible]	Acacia catechu	0.056	0.01	-	-	-	-	-		0.068	0.1
[illegible]	Lannea coromandelica	0.121	0.034	-	-	-	-	-	-	0.155	0.1
[illegible]	Pinus roxburghii	2.329	8.939	18.156	23.078	23.731	14.838	4.144	2.389	97.80[illegible]	96.5
[illegible]	Quercus incana	0.385	0.155	0.090	-	-	-	-	-	0.630	0.6
[illegible]	Rhododendron arboreum	0.004	-	-	-	-	-	-	-	0.004	0
[illegible]	Rest of species*	0.728	0.397	0.219	0.385	-	0.174	-	2.984	4.887	4.[illegible]
	TOTAL :	3.623	9.537	18.465	23.463	23.731	15.012	4.144	5.573	103.548	
	% :	3.5	9.2	17.8	22.7	22.9	14.5	4.0	5.4		100

* Rest of the species include- Casearia spp., cassia fistula, Cedrela toona, Dalbergia sissoo, Ficus spp., Flacourtia spp., Syzygium cumini, Lyonia ovalifolia, Mallotus philippinensis Ougenia dalbergioides, Pyrus pashia, Terminalia belerica, Zyzyphus species. Alnus nitida, Anogeissus latifolia, Grewia oppositifolia, Punica granatum, Sapindus emarginatus, Bombax ceiba, Butea monosperma, cochlospermum religiosum and Miscellaneous species.

Contents

Table No. IV.2.12

Distribution of stems per hectare by species and diameter classes in accessible tree-forest area

Forest type : Chir

Unit : No. of stems

Area : 127652 ha.

S. No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Acacia catechu	1.173	0.061	-	-	-	-	-	-	1.234	1.0
2.	Lannea coromandelica	1.965	0.126	-	-	-	-	-	-	2.091	1.6
3.	Pinus roxburghii	[illegible].833	23.351	23.076	15.817	10.159	4.165	0.851	0.390	104.142	80.
4.	Quercus incana	5.142	0.664	0.136	-	-	-	-	-	5.942	4.6
5.	Rhododenron arboreum	0.065	-	-	-	-	-	-	-	0.065	0.1
.	Rest of species	12.204	2.076	0.460	0.455	-	0.065	-	0.061	15.321	11.9
	Total:	46.382	26.778	23.672	16.272	10.159	4.230	0.851	0.451	128.795	
	% :	36.0	20.7	18.4	12.6	7.9	3.3	0.7	0.4		100
	Basal area (cm^2)	8200	13150	22784	25890	24145	14042	3761	2560	114532	

Crop dia = 33.6 cms.

Contents

Table No. IV.2.13.

Distribution of volume per hectare by species and diameter classes in accessible tree forest area.

Forest type : Mixed conifers

Unit

Area : Hectare.

Species name	DIAMETER CLASSES 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
Abies pindrow	-	-	-	6.467	-	24.419	9.941	33.[illegible]	[illegible].079	22.[illegible]
Abies smithiana	2.963	3.545	6.232	9.376	-	-	-	-	[illegible].121	8.0
Cedrus deodara	[illegible].780	6.822	11.242	12.792	4.418	6.21[illegible]	-	-	44.260	[illegible]0.6
Pinus excelsa	0.[illegible]07	2.962	12.084	5.918	39.812	20.675	18.834	3[illegible].124	136.347	41.0
Pinus [illegible]	0.160	-	-	-	-	-	-	-	0.160	0.1
Other species (Juniperus [illegible], Quercus dilatata & Ribes [illegible])	0.510	1.172	3.084	2.262	-	9.195	5.97[illegible]	2[illegible].358	4[illegible].556	14.8
Total	7.359	14.501	32.642	36.815	44.230	60.505	34.750	94.734	325.5[illegible]	
%	2.2	4.5	10.0	11.3	13.6	18.6	10.[illegible]	29.1		100

Contents

Table No. IV.2.14.

Distrib tion of stems per hectarc b spec. and diam.ter classes in accessible tr ost area.

Forest type : Mixed fers

Unit : No. o ems

Area : 5202 ecare.

S.No	Species name	DIAMETER CLASSES (in cm) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	ies pindrow	-	-	-	3.333	-	5.000	1.667	3.333	13.333	7.0
.	es smithiana	23.334	8.333	6.667	5.000	-	-	-	-	43.334	22.8
	rus deodara	16.667	15.000	11.667	8.333	1.667	1.667	-	-	55.001	28.9
,	Pi s excelsa	5.000	5.000	11.666	3.333	13.333	5.000	3.333	5.000	51.665	27.2
,	Qu cus incana	1.667	-	-	-	-	-	-	-	1.667	0.9
5.	Re . of species	8.334	5.000	3.333	1.667	-	3.333	1.667	1.667	25.001	13.2
	otal:-	55.002	33.333	33.333	21.666	15.000	15.000	6.667	10.000	190.001	
		29.0	17.5	17.5	11.4	7.9	7.9	3.5	5.3		100
	s area (cm^2)	9723	16369	32083	34472	35651	49795	29466	56768	264327	

Crop dia = 44.8 cms.

Contents

Table No. IV.2.15.

Distribution of volume per hectare by species and diameter classes in accessible tree forest area

Forest type : Hardwood mixed with conifers
Unit : m^3 (r)
Area : 31679 [illegible] hectare.

	Species name	DIAMETER CLASSES (in cms)									
		10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
[illegible]	Abies pindrow	-	-	-	-	-	[illegible].077	-	7.553	8.630	[illegible]
[illegible]	Abies spectabilis	-	-	-	0.653	-	-	-	-	0.653	0.8
	Bumpus illichiana	1.333	0.1[illegible]4	0.[illegible]8	-	-	-	-	-	1.715	2.0
4.	Cedrus deodara	0.481	0.144	0.[illegible]	0.588	0.817	-	-	2.[illegible]24	4.7[illegible]	5.6
[illegible]	[illegible] neanthoman elica	0.412	0.829	0.7[illegible]0	0.207	-	-	-	-	[illegible]	2.[illegible]
[illegible]	[illegible] dilusspecies	0.103	-	-	-	-	-	-	-	[illegible].1.3	0.1
7.	Pinus excelsa	0.282	-	-	0.595	1.523	2.687	1.476	-	6.563	7.7
[illegible]	Pinus roxburghii	0.42[illegible]	67[illegible]	2.90[illegible]	4.[illegible]82	9.0[illegible]9	3.[illegible]98	-	-	21.174	[illegible]
[illegible]	[illegible]	2.[illegible]94	323	3.647	3.086	0.993	1.590	1.079	1.812	18.324	22.[illegible]
10.	[illegible] rpi-[illegible]	0.677	1.610	1.028	1.373	-	-	-	-	4.718	5.[illegible]
[illegible]	Rh[illegible]ron [illegible] eu	0.044	0.044	0.131	-	-	-	-	-	0.2[illegible]9	0.3
12.	[illegible]	0.194	0.109	0.086	-	-	-	-	-	0.[illegible]9	0.[illegible]
13.	Rest of the species*	5.115	2.953	2.903	0.392	0.413	1.285	0.954	-	14.515	17.[illegible]
	Total :	11.707	10.864	12.106	11.736	12.835	10.437	3.509	11.589	84.783	
	% :	13.6	12.8	14.4	13.8	15.1	12.3	4.1	13.7		100

*Rest of the species include- Albizzia lebbek, Casearia species, Bauhinia spp., Cedrela toona, Flacourtia spp. Emblica officinalia, Mallotus philippinensis, Punica granatum, Pyrus pashia, Quercus species, Syzygium cumini, Cassia fistula, Zyzyphus spp., Dalbergia sissoo and miscellaneous species.

Contents

Table No. IV.2.16

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Forest type : Hardwood mixed with Conifers
Unit : No. of stems
Area : 31679 ha.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	-	-	-	-	-	0.282	-	0.846	1.128	0.5
2.	Abies smithiana	-	-	-	0.282	-	-	-	-	0.282	[illegible]
3.	Acacia catechu	8.628	0.751	0.238	-	-	-	-	-	9.617	3.[illegible]
4.	[illegible] wallichiana	23.401	0.846	0.564	-	-	-	-	-	24.811	9.[illegible]
5.	Cedrus deodara	3.[illegible]33	0.282	0.564	0.282	0.282	-	-	0.282	5.075	[illegible]
6.	Lannea coromandelica	1.57[illegible]	3.463	1.19[illegible]	0.282	-	-		-	9.[illegible]10	3.[illegible]
7.	[illegible]chilus species	1.692	-	-	-	-	-	-	-	[illegible].692	[illegible]
8.	[illegible]	1.410	-	-	0.282	0.564	0.564	0.282	-	[illegible]92	[illegible]
9.	[illegible]	[illegible].674	1.870	3.523	3.150	3.867	1.096	-	-	[illegible]	[illegible]
10.	[illegible]	25.[illegible]	14.565	5.560	2.[illegible]	0.548	0.564	[illegible].282	0.[illegible]32	[illegible]	19.[illegible]
11.	[illegible]	[illegible]	[illegible].793	1.410	[illegible].128	-	-	-	-	[illegible]	[illegible]
12.	[illegible]	0.[illegible]	0.[illegible]66	0.266	-	-	-	-	-	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]3.74[illegible]	13.[illegible]	5.26[illegible]	[illegible].128	0.282	0.564	0.266	-	10.[illegible]	[illegible]
	Total :	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.070	[illegible]	[illegible]	[illegible]	
	% :	[illegible]	[illegible].3	[illegible]	[illegible]	2.2	[illegible].2	[illegible].3	[illegible]		[illegible]
	[illegible] :	30330	19968	17880	14383	13175	10191	3669	8004	117600	

Contents

Table No. 2.17

Distribution of volume per hectare by species and diameter classes in accessible tree forest area

Forest type : Upland hardwoods
Unit : m^3 (r)
Area : 46599 ha.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Machilus spp.	1.026	0.539	1.107	1.375	0.874	-	-	-	4.921	4.2
2.	Pinus excelsa	-	-	0.133	-	-	0.650	-	-	0.783	0.7
3.	Pinus roxburghii	-	-	-	0.290	0.501	-	-	-	0.791	0.7
4.	Quercus incana	9.529	16.064	19.997	16.192	9.401	4.642	0.693	2.342	78.850	67.[illegible]
5.	Quercus semicarpifolia	1.876	1.833	1.749	1.220	1.544	1.391	0.620	2.793	13.026	11.2
6.	Rhododendron arboreum	0.705	1.598	1.483	0.937	-	-	1.22	-	5.945	5.1
7.	Abies pindrow	0.053	0.00	-	-	-	-	-	-	0.053	0.1
8.	Buxus wallichiana	0.389	0.030	-	-	-	-	-	-	0.389	0.3
9.	Abies smithiana	-	-	-	-	1.595	-	-	-	1.595	1.4
10.	Rest of species*	1.856	1.629	0.904	0.965	1.563	0.423	-	2.574	9.914	8.5
	Total :	15.404	21.693	25.373	20.979	15.478	7.106	2.525	7.709	116.267	
	% :	13.3	18.7	21.8	18.0	13.3	6.1	2.2	6.6		100

* Rest of the species include- Aesculus indica, Celtis australis, Lyonia ovalifolia, Pyrus pashia, Quercus dilatata, Cedrella serrata, Juglans regia, Prunus cornata, Symplocos crataegoides and miscellaneous species.

Contents

Table No. IV.2.1[illegible].

Distribution of stems per hectare by species and diameter in accessible tree forest area

Forest type : Upland hardwoods.
Unit : No. of stems.
Area : 4659[illegible] hectare.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	0.400	-	-	-	-	-	-	-	0.400	0.1
2.	Abies smithiana	-	-	-	-	0.613	-	-	-	0.613	0.2
3.	Buxus wallichiana	6.400	0.200	-	-	-	-	-	-	6.600	1.8
4.	Machilus species	14.704	2.702	2.[illegible]92	1.464	0.546	-	-	-	21.708	6.1
5.	Pinus excelsa	-	-	0.[illegible]73	-	-	0.173	-	-	0.346	0.1
6.	Pirus roxburghii	-	-	-	0.173	0.173	-	-	-	0.346	0.1
7.	Quercus incana	123.525	55.286	31.338	13.062	4.888	1.598	0.173	.373	230.243	64.2
8.	Quercus semicarpifolia	22.[illegible]00	6.552	2.563	1.092	0.825	0.479	0.173	0.346	34.336	9.6
9.	Rhododendron arboreum	9.938	7.710	3.076	1.065	-	-	0.306	-	22.145	6.2
10.	Rest of species	29.449	7.710	1.956	1.065	0.8[illegible]2	0.173	-	0.346	41.591	11.6
	Total	20[illegible]6.766	80.160	41.404	17.921	7.937	2.423	0.652	1.065	358.328	
	%	57.7	22.4	11.5	5.0	2.2	0.7	0.2	0.3		100
	Basal area (cm^2)	36553	39364	39851	28514	18864	8043	2882	6046	180117	

Crop dia = 25.3 cm.

Contents

Table No. IV.2.19

Distribution of volume per hectare by species and diameter in accessible tract of rest area

Forest type : Khair
Unit : m^3 (r)
Area : 6317 ha.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Acacia catechu	3.155	0.573	0.420	-	-	-	-	-	4.148	20.5
2.	Pinus roxburghii	-	-	-	2.240	-	4.243	5.510	-	12.993	59.2
3.	Lannea coromandelica	0.970	0.561	-	-	-	-	-	-	1.531	7.6
4.	Rest of species *	1.178	0.741	0.665	-	-	-	-	-	2.584	12.7
	Total :	5.303	1.875	1.085	2.240	-	4.243	5.510	-	20.256	
	% :	26.2	9.3	5.4	11.0	-	20.9	27.2	-		100

* Rest of species include- Butea monosperma, Casearia species, Cassia fistula, Emblica officinalis, Flacourtia species, Mallotus philippinensis, Ougeinia dalbergiodes, Zyzyphus, species and Miscellaneous species.

Contents

Table No. IV.2.20

Distribution of stems per hectare by species and diameter in accessible tree forest area

Forest type : Khair
Unit : No. of stems
Area : 6317 ha.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Acacia catechu	70.373	3.767	1.256	-	-	-	-	-	75.396	56.1
2.	Lannea coromandelica	26.369	2.511	-	-	-	-	-	-	28.880	21.5
3.	Pinus roxburghii	-	-	-	1.334	-	1.256	1.256	-	3.846	2.9
4.	Rest of species	21.284	3.705	1.256	-	-	-	-	-	26.245	19.5
	Total :	118.026	9.983	2.512	1.334	-	1.256	1.256	-	134.367	
	% :	87.8	7.4	1.9	1.0	-	1.0	0.9	-		100
	Basal area (cm^2) :	20865	4902	2418	2123	-	4169	5551	-	40028	

Cror dia = 19.5 cms.

Contents

Table No. IV.2.21

Distribution of volume per hectare by species and diameter in accessible tree forest area.

Forest type : Miscellaneous forest
Unit : m^3 (r)
Area : 45596 ha.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Acacia catechu	0.418	-	-	-	-	-	-	-	0.418	1.8
2.	Lannea coromandelica	0.786	1.406	1.330	-	-	-	-	-	3.522	14.8
3.	Machilus species	0.016	0.025	-	-	-	-	-	-	0.041	0.2
4.	Pinus roxburghii	0.023	0.059	-	1.219	-	0.732	-	-	2.033	8.5
5.	Quercus incana	1.550	2.894	0.955	0.961	-	0.562	-	0.955	7.877	33.2
6.	Rest of species*	4.942	2.130	0.866	0.588	0.286	-	-	1.037	9.849	41.5
	Total :	7.735	6.514	3.151	2.768	0.286	1.294	-	1.992	23.740	
	% :	32.6	27.4	13.2	11.7	1.2	5.5	-	8.4		100

* Rest of the species include - Albizzia lebbek, Bombax ceiba, Butea monosperma, Cassia fistula, Dalbergia sissoo, Emblica officinalia, Erythrina suberosa, Flacourtia spp., Mallotus philippinensis, Ougeinia dalbergioides, Pyrus pashia, Syzygium cumini, Terminalia belerica, Wrightia tinctoria, Zyzyphus spp., Bauhinia spp., Celtis australis, Punica granatum, Quercus spp., Acacia spp., Albizzia procera, Cedrella toona, Ficus spp., Grewia oppositifolia, Kydia calycina, and miscellaneous species.

Contents

Table No. IV.2.22

Distribution of stems per hectare by species and diameter classes in accessible tree forest area:

Forest type : Miscellaneous forest
Unit : No. of stems
Area : 45596 ha.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	[illegible]	9.994	0.361	-	-	-	-	-	-	10.355	6.6
2.	[illegible] coromandelica	9.397	5.209	2.130	-	-	-	-	-	17.236	[illegible]
3.	[illegible]ilus species	0.179	0.179	-	-	-	-	-	-	0.358	0.2
4.	Pinus roxburghii	0.179	0.179	-	0.903	-	0.179	-	-	1.440	0.9
5.	[illegible]ous indica	17.050	9.553	1.652	0.908	-	0.179	-	0.179	29.430	18.6
6.	[illegible] of species	86.272	9.956	2.001	0.544	0.185	-	-	0.179	99.137	[illegible]
	Total	123.580	25.537	5.583	2.355	0.185	0.358	-	0.358	157.956	
	%	78.3	16.2	3.5	1.5	0.1	0.2	-	0.2		100
	[illegible]sal area (cm^2)	21847	12540	5374	3747	440	1188	-	2032	47168	

Crop di[illegible] 19.5 cms.

Contents

Table No. IV.2.23

Distribution of volume per hectare by species and diameter classes in accessible tree forest area.

Stratum : Udhampur district.

Area of stratum : 153046 ha.
No. of sample plots : 184
Unit : m^3 (r)

Species	DIA CLASSES (cms) 16-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
Abies pindrow	0.02	0.11	0.26	1.30	2.79	4.23	7.14	22.64	38.49	23.50
Abies smithiana	0.16	0.98	2.03	4.02	2.67	2.59	2.76	4.01	19.[illegible]	11.92
[illegible]drus deodara	0.53	0.52	1.86	1.64	1.95	4.28	[illegible]	[illegible]	[illegible]	9.49
Pinus excelsa	0.21	0.69	1.79	2.61	5.13	4.85	[illegible]	[illegible]	[illegible]	10.30
Pinus roxburghii	1.16	3.99	8.50	7.72	6.67	[illegible]	[illegible]	[illegible]	36.10	22.04
[illegible] dilatat	0.09	0.11	0.11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.11
[illegible] indan	2.43	4.38	4.15	[illegible]	[illegible]	1.27	0.43	1.30	18.03	11.01
[illegible] semilanceolata	0.33	0.43	[illegible]	[illegible]	[illegible]	0.44	0.40	0.85	3.65	2.23
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.[illegible]0	0.27	0.22	0.50	2.60	1.59
[illegible]	1.[illegible]	[illegible]	1.31	1.22	1.00	0.27	0.00	0.60	7.87	4.8[illegible]
[illegible]	7.86	13.06	20.79	22.12	21.77	23.87	16.91	37.38	163.76	
%	4.80	7.97	12.69	13.51	13.29	14.58	10.33	22.83		100

Footnote:

The species comprising less than one percent of total volume have been clubbed together in stock & stand tables under rest of the species and which comprise of Alnus nitida, Anogeissus latifolia, Bauhinia spp., Buxus wallichiana, Caseria tomentosa/ellipticea, Cassia fistula, Cedrela serrata/toona, Celtis australis, Dalbergia sisso, Emblica officinalis, Erythrina suberosa, Ficus spp., Flacourtia spp., Grewia oppositifolia, Juglans regia, Kydia calycina, Lannea coromandelica, Lyonia ovalifolia, Machilus spp., Mallotus spp., Ougeinia dalbergioides, Prunus cornata, Punica granatum, Pyrus pashia, Quercus spp., Rhododendron arboreum, Sapindus emarginatus, Symplocos crataegoides, Syzygium cumini, Terminalia belerica, Vitex negundo, Zizyphus spp., Areca spp.

Contents

Table No. IV.2.24

Distribution of stems per hectare by species and diameter classes in accessible tree forest area:

Stratum : Udhampur district.

Area of stratum : 153046 ha.

No. of sample plots : 184

Unit : m^3 (r)

Species	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
Abies pindrow	0.11	0.22	0.24	0.60	0.96	0.98	1.24	2.22	6.57	3.20
Abies smithiana	3.61	2.18	2.03	2.21	0.93	0.60	0.44	0.37	12.37	6.02
Cedrus deodara	3.14	1.17	1.83	0.95	0.67	1.05	0.22	0.39	9.42	4.58
Pinus excelsa	1.12	1.20	1.64	1.40	1.71	1.14	0.37	0.37	8.95	4.35
Pinus roxburghii	13.13	10.58	10.80	5.29	2.88	1.52	0.48	0.05	44.73	21.76
Quercus dilatata	1.68	0.44	0.11	0.06	0.00	0.11	0.06	0.06	2.52	1.22
Quercus incana	29.09	14.68	6.66	2.41	0.58	0.44	0.11	0.22	54.19	26.36
Quercus semicarpifolia	5.35	1.3	0.61	0.29	0.21	0.14	0.11	0.10	8.12	3.95
Misc. species	12.20	1.60	0.68	0.34	0.00	0.12	0.05	0.05	15.04	7.32
Rest of the species*	31.93	6.86	2.67	1.40	0.59	0.11	0.00	0.11	43.67	21.24
Total :	101.36	40.24	27.27	14.95	8.53	6.21	3.08	3.94	205.58	
% :	49.30	19.58	13.26	7.27	4.15	3.02	1.50	1.92		100

Contents

Table No. IV. 2.25

Distribution of volume per hectare by species and diameter classes in accessible tree forest area:

Stratum : Jammu district.

Area of stratum : 33907 ha.
No. of sample plots : 43
Unit : m^3 (r)

Species	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
Pinus roxburghii	1.15	3.1[illegible]	5.37	13.65	12.47	7.63	0.00	1.66	45.09	76.57
Misc. species	0.17	0.03	0.00	0.00	0.00	0.00	0.00	11.23	11.48	19.49
Rest of species *	1.49	0.75	0.08	0.00	0.00	0.00	0.00	0.[illegible]0	2.32	3.94
Total :	2.81	3.99	5.45	13.65	12.47	7.63	0.00	12.89	58.89	
% :	4.78	6.77	9.26	23.19	21.17	12.96	0.00	21.89		100

* Foot note:

The species comprising less than one percent of total volume have been clubbed together in stock & stand tables under rest of the species and which comprise of Acacia catechu, Acacia spp., Anogeissus latifolia, Bombex ceiba/ malabaricum, Butea monosperma, Caseria tomentosa/ elliptica, Cassia fistula, Dalbergia sissoo, Emblica officinalia, Flacourtia indica, Lannea coromandelica, Mallotus philippinensis, Ougeinia dalbergioides, Zizyphus mauratiana/jujuba, Zizyphus species.

Contents

Table No. IV.2.76.

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Stratum : Jammu district

Area of stratum : 33927 hectare
No. of sample plots : 43
Unit : No. of stems.

Species	DIAMETER CLASSES (in cms)									
	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
Pinus roxburghii	10.14	9.20	7.37	9.21	5.30	2.07	0.00	0.23	43.52	56.94
Misc. species	3.05	0.47	0.00	0.00	0.00	0.00	0.00	0.23	3.75	4.91
Rest of species	25.46	3.48	0.22	0.00	0.00	0.00	0.00	0.00	29.16	38.15
Total:-	38.65	13.15	7.59	9.21	5.30	2.07	0.00	0.46	76.43	
%	50.57	17.20	9.93	12.05	6.94	2.71	0.00	0.60		100

Contents

Table No. IV.2.27

Distribution of volume per hectare by species and diameter classes in accessible tree forest area.

Stratum : Kathua district.

Area of stratum : 57114 hectare

No. of sample plots : 59

Unit : m^3 (r)

Species	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80	Total	%
Abies pindrow	1.64	0.79	0.24	0.00	0.00	0.00	0.78	6.38	9.83	7.72
Abies smithiana	0.83	1.71	4.76	5.43	3.87	1.74	0.96	4.70	24.00	18.85
Cedrus deodara	1.18	2.53	2.28	3.28	5.24	4.15	0.86	9.78	29.30	23.02
Lannea coromandelica	0.45	0.74	0.77	0.00	0.00	0.00	0.00	0.00	1.96	1.54
Pinus roxburghii	0.64	3.61	7.42	9.46	7.18	4.75	2.03	0.00	35.09	27.56
Quercus incana	1.11	1.57	3.02	4.10	2.36	0.65	0.00	0.00	12.81	10.06
Quercus semicarpifolia	1.13	1.24	0.84	0.84	0.76	0.75	0.00	1.78	7.34	5.77
Rhododendron arboreum	0.38	0.71	0.35	0.00	0.00	0.00	1.00	0.00	2.44	1.92
Rest of the species*	3.09	0.92	0.52	0.00	0.00	0.00	0.00	0.00	4.53	3.56
Total:-	10.45	13.82	20.20	23.11	19.41	12.04	5.63	22.64	127.30	
%	8.21	10.85	15.87	18.15	15.25	9.46	4.42	17.79		100

* Foot note :-

The species comprising less than one percent of total volume have been clubbed together in stock and stand tables under rest of the species and which comprise of Acacia catechu, Albizzia lebbek, Bombax ceiba, malabaricum, Butea monosperma, Caseria tomentosa, Cassia fistula, Cochlospermum religiosum, Dalbergia sissoo, Emblica officinalia, Erythrina suberosa, Flacourtia indica, Flacourtia spp., Grewia oppositifolia, Lyonia ovalifolia, Mallotus philippinensis, ougeinia delbergioides, Prunus cornata, Pyrus pashia, Syzygium cumini, Terminalia belerica, Vitex negundu, Wrightia

Contents

Table No.IV.2.28

Distribution of Stems per hectare by species and diameter classes in accessible tree forest area.

Stratum : Kathua district.

Area of stratu : 57114 Hectr s.

No. of sample plots : 59

Unit : No. of stems.

Species	DIAMETER CLASSES (cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
Abies pindrow	11.52	1.81	0.28	0.00	0.00	0.00	0.14	0.42	14.17	6.34
Abies smithiana	6.53	3.75	4.58	2.92	1.33	0.42	0.14	0.56	20.2[illegible]	9.05
Cedrus deodara	6.25	5.83	2.36	1.94	1.94	0.97	0.14	0.28	19.71	8.82
Lannea coromandalica	7.53	2.80	1.19	0.00	0.00	0.00	0.00	0.00	11.61	5.20
Pinus roxburghii	6.75	9.58	9.28	6.65	3.06	1.36	0.44	0.00	37.12	16.61
Quercus incana	14.90	5.76	4.30	3.39	1.25	0.25	0.00	0.00	29.85	13.36
Quercus semicarpifolia	11.00	4.50	1.25	0.75	0.39	0.25	0.00	0.28	18.42	8.24
Rhododendron arboreum	5.50	3.50	0.75	0.00	0.00	0.00	0.25	0.00	10.00	4.47
Rest of species	55.74	5.45	1.17	0.00	0.00	0.00	0.00	0.00	62.36	27.91
TOTAL	125.72	43.07	25.16	15.65	7.97	3.25	1.11	1.54	223.47	
%	56.26	19.28	11.26	7.00	3.57	1.45	0.50	0.68		100

Contents

Table No. IV.2.29

Distribution of volume per hectare by species and diameter classes in accessible tree forest area:

Stratum : Rajouri district

Area of stratum : 75033 ha.
No. of sample plots: 85
Unit : $m^3(r)$

Species	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
Abies pindrow	0.27	0.37	0.97	1.15	0.95	1.84	1.92	3.07	10.54	10.65
Abies smithiana	0.04	0.00	0.00	0.28	0.00	0.00	0.98	2.98	4.28	4.32
Machilus species	0.37	0.08	0.49	0.39	0.16	0.00	0.00	0.00	1.49	1.5[illegible]
Pinus roxburghii	0.76	3.21	6.71	13.07	19.81	9.[illegible]6	1.63	2.99	57.94	58.65
Quercus incana	2.76	3.98	4.08	3.17	2.34	1.09	0.00	0.88	18.32	18.51
Rest of the species *	2.06	1.43	1.12	0.65	0.83	0.00	0.40	0.00	6.49	6.56
Total :	6.28	9.07	13.37	18.71	24.09	12.59	4.93	9.92	98.96	
% :	6.34	9.16	13.51	18.92	24.35	12.72	4.98	10.02		100

To note:-

The species comprising less than one percent of total volume have been clubbed together in the stand tables under rest of the species and which comprise of Acacia catechu, Aesculus indica, Albizzia lebbek, Bauhinia spp., Cornus wallichiana, Grewia tomentosa/ellipsica, Grewia spp., Cassia fistula, Celtis serrata/tenuis, Celtis australis, Dalbergia sissoo, Dalbergia [illegible] officinalis, Ficus spp., Ilex [illegible], Elaeagnus species, Juglans regia, Lannea coromandelica, [illegible], Pistacia integerrima, [illegible] Dalbergioides, Punica granatum, Pyrus pashia, [illegible] dilatata, Quercus glauca, Quercus semicarpifolia, Quercus spp., Rhododendron arboreum, [illegible] canina, Terminalia belerica, Zizyphus species, and Miscellaneous spp.,

Contents

Table No. IV.2.30

Distribution of stems per hectare by species and diameter classes in accessible tree forest area.

Stratum : Rajouri district

Area of stratum : 75033 hectare
No. of sample plots : 85
Unit : No. of stems.

Species	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
Abies pindrow	1.58	0.75	0.90	0.60	0.30	0.45	0.30	0.30	5.18	3.11
Abies smithiana	0.60	0.00	0.00	0.15	0.00	0.00	0.15	0.15	1.05	0.63
Machilus species	5.58	0.50	1.00	0.37	0.12	0.00	0.00	0.00	7.57	4.55
Pinus roxburghii	9.10	8.43	8.31	8.99	8.43	2.70	0.34	0.45	46.75	28.10
Quercus incana	36.73	14.15	6.36	2.44	1.23	0.37	0.00	0.12	61.40	36.90
Rest of the species	34.58	6.61	2.05	0.72	0.26	0.12	0.11	0.00	44.45	26.71
Total:-	88.17	30.44	18.62	13.27	10.34	3.64	0.90	1.02	166.40	
%	52.99	18.30	11.19	7.97	6.21	2.19	0.54	0.61		100

Contents

Table No. IV.2.31

Distribution of volume per hectare by species and diameter classes in accessible tree forest area.

Total area : 319120 hectare

S.No.	Species name	DIAMETER CLASSES (in cms)									
		10-20	20-30	30-40	40-5	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	0.369	0.261	0.398	0.893	1.562	2.463	4.014	12.720	22.705	17.34
2.	Abies smithiana	0.382	0.774	1.826	2.967	1.971	1.554	1.726	3.465	14.665	11.21
3.	Betula wallichiana	0.189	0.019	0.019	-	-	-	-	-	0.227	0.17
4.	Cedrus deodara	0.464	0.705	1.301	1.366	1.874	2.796	0.770	3.415	12.691	9.69
5.	Lannea coromandelica	0.222	0.308	0.261	0.027	-	-	-	-	0.818	0.62
6.	Machilus spp.	0.163	0.094	0.219	0.222	0.128	-	-	-	0.826	0.63
7	Pinus excelsa	0.104	0.332	0.860	1.253	2.461	2.324	0.999	1.337	9.670	7.39
8.	Pinus roxburghii	0.977	3.652	7.551	9.910	10.468	6.501	1.892	1.036	41.994	32.08
9.	Quercus incana	2.017	3.322	3.507	2.872	1.516	0.982	0.207	0.833	15.256	11.65
10.	Quercus semicarpifolia	0.363	0.430	0.358	0.314	0.419	0.346	0.193	0.726	3.149	2.41
11.	Rhododendrum arboreum	0.109	0.237	0.229	0.137	0.046	-	0.178	-	0.936	0.72
12.	Acacia catechu	0.193	0.027	0.017	-	-	-	-	-	0.237	0.18
13.	Rest of the species	1.898	1.188	0.768	0.649	0.436	0.410	0.299	2.152	7.730	5.91
	Total:-	7.450	11.302	17.314	20.617	20.881	17.376	10.278	25.686	130.904	
	%	5.69	8.63	13.23	15.75	15.95	13.28	7.85	19.61		100

Contents

Table No. IV.7.32

Distribution of total volume by species and diameter classes in accessible tree forest area

Total area : 319120 ha.

Unit : 000 m³

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	117.789	90.496	126.974	285.027	498.378	786.125	1230.937	4059.910	7245.636	17.3
2.	Abies smithiana	122.010	247.092	582.918	946.954	628.864	496.048	550.697	1105.862	4680.445	11.2
3.	Buxus wallichiana	60.532	5.957	5.968	-	-	-	-	-	72.457	0.17
4.	Cedrus deodara	147.891	294.764	415.174	435.873	598.065	892.203	245.606	1030.720	4049.296	9.67
5.	Larix griffithiana	70.531	90.035	83.141	8.470	-	-	-	-	252.407	0.60
6.	Malus species	51.812	30.274	69.847	70.334	40.743	-	-	-	262.510	0.63
7.	Pinus excelsa	33.039	105.006	274.425	399.949	785.738	741.706	318.876	426.397	3085.603	7.37
8.	Pinus roxburghii	341.704	1105.296	2409.757	3164.834	3340.647	2074.553	603.788	330.526	13401.102	32.0
9.	Quercus incana	643.540	1029.960	1119.169	916.570	483.679	313.485	66.015	265.761	4762.179	11.4
10.	Quercus semicarpifolia	145.298	137.304	114.085	100.336	133.603	110.349	61.494	231.592	1004.651	2.4
11.	Rhododendron arboreum	34.911	75.855	73.774	43.691	14.535	-	56.930	-	299.098	0.71
12.	Salix babylonica	11.098	8.603	5.379	-	-	-	-	-	25.080	0.06
13.	Rest of species	601.405	356.736	245.309	206.986	139.273	130.925	95.375	686.621	2462.710	5.9
	Total :	2376.352	3606.341	5525.419	6579.524	6663.025	5545.394	3279.720	8196.679	41772.054	
	% :	5.69	8.63	13.23	15.75	15.95	13.28	7.85	19.62		100

Contents

Table No. IV.2.33

Distribution of stems by species and diameter class in accessible tree forest area

Total area : 319120 hectare.

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Acacia catechu	4.147	0.225	0.048	-	-	-	-	-	4.4[illegible]	2.3[illegible]
2.	Abies pindrow	24.94	0.609	0.377	0.427	0.530	0.575	0.689	1.208	6.909	3.7[illegible]
3.	Abies smithiana	3.039	1.715	1.793	1.617	0.686	0.364	0.272	0.311	9.797	5.[illegible]
4.	Cedrus deodara	2.026	1.0[illegible]	1.303	0.803	0.668	0.677	0.131	0.235	8.052	4.2[illegible]
5.	Lannea coromandelica	3.177	1.109	0.423	0.028	-	-	-	-	4.8[illegible]	2.5[illegible]
6.	Machilus species	2.3[illegible]0	0.[illegible]00	0.441	0.240	0.080	-	-	-	3.[illegible]1	1.[illegible]
7.	Pinus excelsa	0.5[illegible]7	0.579	0.787	0.673	0.821	0.547	0.177	0.176	4.297	2.2[illegible]
8.	Pinus roxburghii	10.723	9.752	9.500	6.821	4.473	1.825	0.389	0.156	43.719	23.5[illegible]
9.	Quercus incana	25.252	11.402	5.460	2.334	0.792	0.341	0.053	0.135	45.769	24.[illegible]
10.	Quercus semicarpifolia	4.[illegible]3	1.43[illegible]	0.515	0.271	0.206	0.111	0.051	0.100	7.023	3.[illegible]
11.	Rhododendron arboreum	1.[illegible]6	1.152	0.475	0.155	0.026	-	0.045	-	3.417	1.8[illegible]
12.	Buxus wallichiana	3.258	0.113	0.056	-	-	-	-	-	3.[illegible]	1.[illegible]
13.	Mixed species	22.[illegible]93	5.315	1.518	0.699	0.268	[illegible].1[illegible]	0.077	[illegible].123	40.[illegible]	21.7[illegible]
	Total :	95.987	35.591	22.776	14.069	8.550	4.602	1.884	2.449	185.[illegible]	
		51.63	19.14	12.25	7.57	4.60	2.48	1.01	1.32		100

Contents

Table No. IV.2.34

Distribution of total stems by species and diameter in accessible tree forest area.

Total area : 319120 hectare

Unit : 000 number

S.No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Acacia catechu	1323.263	71.864	15.472	-	-	-	-	-	1410.599	2.38
2.	Abies pindrow	795.638	194.307	120.253	136.345	169.243	183.618	219.981	385.635	2205.020	3.72
3.	Abies smithiana	969.853	547.348	572.127	515.959	218.926	116.073	86.694	99.325	3126.305	5.27
4.	Cedrus deodara	838.040	513.507	415.787	256.398	213.132	216.009	41.692	75.059	2569.624	4.33
5.	Lannea coromandelica	1013.672	379.127	134.798	8.931	-	-	-	-	1536.528	2.59
6.	Machilus species	747.005	159.414	140.540	76.684	25.434	-	-	-	1149.077	1.93
7.	Pinus excelsa	171.441	184.740	251.068	214.738	261.935	174.694	56.446	56.268	1371.330	2.31
8.	Pinus roxburghii	3421.778	3111.998	3057.274	2176.569	1427.418	582.501	124.123	49.795	13951.456	23.52
9.	Quercus incana	8058.349	3638.586	1742.558	744.896	252.639	108.950	16.989	42.931	14605.[illegible]	24.62
10	Quercus semicarpifolia	1447.870	457.177	164.392	86.616	65.875	35.466	16.310	31.976	2305.6[illegible]	3.89
11	Rhododendron arboreum	499.002	367.723	151.739	49.607	8.440	-	14.278	-	1090.[illegible]39	1.84
12	Taxus wallichiana	1039.457	36.111	17.862	-	-	-	-	-	1093.430	1.84
13	Rest of species	10305.238	1696.085	484.604	223.217	85.629	51.678	24.685	40.870	12912.006	21.76
	Total:-	30630.606	11357.987	7268.474	4489.960	2728.671	1468.989	601.198	781.859	59327.744	
		51.63	19.14	12.25	7.57	4.60	2.48	1.01	1.32		100

Contents

Appendix - I

Year of survey and publication of survey of India topo maps used for forest inventory in Jammu region

Topo sheet No.	Year of survey	Year of publication
43 K/2	1913, 1960-62	1963
43 K/3	1912-13 and 1960-62	1963
43 K/4	1912-13, 1957-58	1966
43 K/6	1962	1964
43 K/7	1961-62	1974
43 K/8	1912-13, 1957-58	not legible.
43 K/10	1962-63	1974
43 K/11	1962-63	1973
43 K/12	1958-59	1961
43 K/15	1962-63	1964
43 K/16	1967-68	1974
43 L/5	These sheets were not in stock with the Zone and inventory was done by taking them on loan from state forest department.	
43 L/9		
43 L/13		
43 L/14		
43 O/3	1961-62	1963
43 O/4	1961-62	1976
43 O/8	1961-62	1962
43 P/1	1961-62	1963
43 P/2	1916-17, 1957-58	1960
43 P/3		
43 P/5	1961-62	1963
43 P/6	1967-68	1973
43 P/7	1972-73	1975
43 P/9	1962-63	1975
43 P/10	1962-63	1973
43 P/11	1967-68	1977
43 P/13	1962-63	1964
43 P/14	1962-63	1964
43 P/15	1956-57	1976

Contents

Appendix - II

LOCATION OF CENTRE OF SAMPLE PLOTS VISITED FOR FOREST INVENTORY

District : Udhampur

Map sheet coverage : 43 K/11,12,15,16
43 L/13
43 O/3,4,8
43 P/1,2,5,6,9

Longitude E Latitude N of plot centre			Forest Division code*	Land use code*	Forest type code*	No of trees enumerated in sample plot of .1 ha.	Vol (m^3) in sample plot of .1 ha.
Degree	Minute	Second					
1			2	3	4	5	6
				Map sheet No. 43 K/11			
74 33	44 16	45 E 39 N	17	02	01	8	10.46
74 33	40 18	15 E 15 N	17	01	08	104	37.22
74 33	42 19	13 E 15 N	17	01	09	49	21.44
74 33	44 19	50 E 11 N	17	02	01	14	9.40
74 33	42 18	39 E 21 N	17	01	09	33	12.50
74 33	44 22	03 E 12 N	17	12	-	-	-
74 33	41 22	50 E 57 N	17	03	09	12	4.45
74 33	41 26	56 E 36 N	17	02	05	13	2.51
74 33	40 28	33 E 02 N	17	02	-	-	-
74 33	41 29	55 E 26 N	17	02	-	-	-
74 33	44 29	25 E 02 N	17	03	-	-	-
				Map sheet No. 43 K/12			
74 33	37 01	15 E 51 N	08	03	20	-	-
74 33	37 02	57 E 17 N	08	03	06	3	3.86
74 33	39 05	11 E 00 N	25	03	20	6	0.22

*Codes explained at end of the appendix.

Contents

1	2	3	4	5	6
74 37 55 E 33 06 08 N	25	03	20	12	1.31
74 41 17 E 33 07 25 N	25	03	20	10	2.60
74 43 22 E 33 06 41 N	25	03	08	13	6.43
74 37 26 E 33 07 43 N	25	01	20	41	3.25
74 38 14 E 33 07 37 N	25	13	-	-	-
74 41 54 E 33 09 20 N	25	01	06	8	10.99
74 44 53 E 33 09 01 N	25	01	09	77	15.91
74 42 38 E 33 08 28 N	25	02	06	11	14.64
74 31 59 E 33 10 13 N	22	02	06	24	1.20
74 37 26 E 33 11 31 N	22	03	09	21	2.46
74 35 02 E 33 11 00 N	22	03	20	22	1.70
74 39 55 E 33 11 28 N	25	01	06	9	8.26
74 37 32 E 33 11 02 N	22	02	06	19	1.87
74 40 38 E 33 11 47 N	25	02	06	1	0.03
74 41 50 E 33 10 44 N	25	01	20	36	2.75
74 43 49 E 33 10 18 N	25	01	20	49	5.26
74 44 00 E 33 12 38 N	25	01	20	15	13.37
74 41 48 E 33 12 40 N	25	01	20	59	20.16
74 43 04 E 33 13 38 N	25	12	-	-	-
74 44 25 E 33 13 53 N	25	01	09	57	21.10
		Map sheet No. 43 K/15			
74 48 20 E 33 17 19 N	17	02	09	-	-
74 50 37 E 33 16 30 N	17	12	-	-	-
74 51 52 E 33 16 00 N	17	03	06	66	18.91

Contents

1	2	3	4	5	6
74 57 56 E 33 15 36 N	17	03	01	01	5.79
74 54 33 E 33 16 54 N	17	03	07	04	23.71
74 46 09 E 33 19 38 N	17	02	09	04	21.50
74 46 21 E 33 17 53 N	17	02	01	16	85.49
74 49 06 E 33 19 44 N	17	02	08	11	5.04
74 50 19 E 33 19 55 N	17	03	06	01	1.94
74 52 08 E 33 17 32 N	17	03	09	13	8.30
74 54 54 E 33 18 43 N	17	03	09	06	14.84
74 56 28 E 33 19 57 N	17	03	01	-	-
74 56 03 E 33 17 33 N	17	12	-	-	-
74 57 46 E 33 19 13 N	17	02	01	10	59.34
74 59 42 E 33 18 17 N	17	02	04	11	18.02
74 46 23 E 33 20 51 N	17	03	06	03	10.41
74 46 08 E 33 21 41 N	17	02	08	-	-
74 54 52 E 33 21 44 N	17	02	01	03	29.70
74 56 17 E 33 22 07 N	17	02	03	-	-
74 58 39 E 33 21 46 N	17	02	-	-	-
74 58 46 E 33 20 41 N	17	02	-	-	-
74 47 52 E 33 23 55 N	17	03	09	-	-
74 49 39 E 33 23 34 N	17	03	09	24	10.87
74 50 19 E 33 23 04 N	17	03	09	03	0.14
74 54 15 E 33 23 19 N	17	03	09	08	2.27
74 53 12 E 33 24 09 N	17	13	-	-	-
74 56 56 E 33 23 07 N	17	02	07	19	72.60

Contents

1	2	3	4	5	6
74 55 33 E 33 24 22 N	17	03	08	14	1.02
74 57 43 E 33 23 50 N	17	02	01	05	42.62
74 59 46 E 33 23 38 N	17	02	-	-	-
74 50 51 E 33 25 55 N	17	02	01	-	-
74 52 56 E 33 26 20 N	17	02	09	42	8.77
74 58 12 E 33 26 33 N	17	02	01	-	-
74 45 06 E 33 27 43 N	17	01	-	-	-
		Map [illegible] No 43 K/16			
74 48 32 E 33 00 58 N	25	03	20	07	1.47
74 51 18 E 33 00 34 N	25	02	08	-	-
74 51 09 E 33 01 54 N	25	02	06	24	17.55
74 58 00 E 33 02 16 N	25	02	-	-	-
74 50 37 E 33 03 00 N	25	03	06	10	5.01
74 54 39 E 33 03 29 N	25	03	06	-	-
74 55 43 E 33 04 2[illegible] N	25	03	06	-	-
74 56 44 E 33 [illegible] 03 N	25	03	-	-	-
74 58 57 E 33 02 49 N	25	02	06	25	18.63
74 49 47 E 33 07 09 N	25	03	20	06	0.72
74 50 39 E 33 07 06 N	25	03	06	08	1.54
74 54 00 E 33 06 45 N	25	03	06	12	3.37
74 53 31 E 33 05 43 N	25	03	06	-	-
74 59 38 E 33 06 26 N	25	02	08	20	4.99
74 46 57 E 33 07 55 N	25	03	06	05	3.28
74 45 33 E 33 09 34 N	25	02	06	17	14.4

Contents

1	2	3	4	5	6
74 48 08 E 33 08 13 N	25	11	-	-	-
74 51 05 E 33 07 47 N	25	03	06	06	5.67
74 56 13 E 33 08 06 N	25	02	06	13	27.77
74 59 39 E 33 08 16 N	25	03	06	07	9.61
74 47 20 E 33 12 13 N	25	02	20	51	7.20
74 45 08 E 33 10 18 N	25	03	20	-	-
74 48 32 E 33 11 29 N	25	03	20	23	2.27
74 52 11 E 33 11 11 N	17	03	07	-	-
74 54 01 E 33 10 36 N	17	02	06	23	22.62
74 53 30 E 33 11 54 N	17	03	08	11	4.08
74 57 25 E 33 11 54 N	17	11	-	-	-
74 55 04 E 33 10 34 N	17	03	06	05	5.06
74 59 00 E 33 11 06 N	17	03	-	-	-
74 49 39 E 32 12 54 N	17	03	08	20	8.12
74 54 11 E 33 14 50 N	17	03	-	-	-
74 57 37 E 33 13 49 N	17	03	01	-	-
		Map sheet No. 43 I/13			
74 53 44 E 33 57 59 N	08	02	06	19	9.13
74 54 29 E 33 56 10 N	25	02	06	27	13.28
		Map sheet No. 43 O/3			
75 01 05 E 33 16 47 N	17	03	04	02	13.23
75 01 25 E 33 15 44 N	17	02	04	22	50.63
75 07 05 E 33 16 52 N	17	03	08	12	5.17
75 02 22 E 33 18 56 N	17	03	04	03	8.89
75 00 08 E 33 18 35 N	17	03	04	01	0.13

Contents

1	2	3	4	5	6
75 04 27 E 33 18 48 N	17	03	-	-	-
75 06 05 E 33 18 24 N	17	13	-	-	-
75 02 26 E 33 20 48 N	17	02	-	-	-
75 02 30 E 33 20 50 N	17	02	-	-	-
75 00 33 E 33 22 36 N	17	03	-	-	-
		Map sheet No. 43 O/4			
75 02 05 E 33 01 33 N	26	02	06	16	14.72
75 04 14 E 33 02 01 N	26	02	04	16	30.16
75 03 16 E 33 00 30 N	26	02	-	-	-
75 05 27 E 33 00 23 N	26	02	06	07	7.16
75 07 04 E 33 02 08 N	26	02	09	42	15.28
75 09 58 E 33 01 12 N	26	12	-	-	-
75 02 22 E 33 04 57 N	26	01	01	18	86.05
75 01 08 E 33 02 32 N	25	03	07	09	28.26
75 02 42 E 33 02 34 N	25	02	01	19	79.17
75 07 10 E 33 04 27 N	26	02	06	05	11.06
75 07 35 E 33 03 23 N	26	12	-	-	-
75 10 16 E 33 04 47 N	26	02	04	27	30.54
75 12 33 E 33 04 22 N	26	03	07	02	10.10
75 01 42 E 33 05 39 N	26	02	08	16	21.06
75 02 49 E 33 06 22 N	26	02	08	07	5.33
75 06 31 E 33 06 10 N	26	02	06	11	4.26
75 06 00 E 33 06 17 N	26	02	06	14	6.55
75 09 19 E 33 06 42 N	26	03	20	01	0.13

Contents

1	2	3	4	5	6
75 14 48 E 33 05 17 N	26	02	03	-	-
75 12 39 E 33 07 13 N	26	01	08	75	27.09
75 00 08 E 33 05 48 N	26	02	06	41	25.44
75 04 54 E 33 08 46 N	26	02	06	16	19.29
75 02 38 E 33 08 43 N	26	13	-	-	-
75 06 12 E 33 09 52 N	26	02	06	05	5.06
75 06 21 E 33 07 37 N	26	13	-	-	-
75 08 41 E 33 08 05 N	26	02	09	57	11.88
75 08 48 E 33 09 26 N	26	01	07	26	26.43
75 10 15 E 33 08 05 N	26	01	09	77	11.87
75 12 17 E 33 09 24 N	26	01	01	-	-
75 01 09 E 33 10 23 N	17	02	08	38	5.56
75 05 35 E 33 12 42 N	17	13	-	-	-
75 06 54 E 33 14 47 N	17	03	06	05	13.40
75 06 08 E 33 10 41 N	26	03	-	-	-
		Map sheet No. 43 O/8			
75 16 24 E 33 00 40 N	26	01	04	36	47.72
75 18 36 E 33 02 15 N	26	01	06	20	31.80
75 23 26 E 33 00 48 N	26	02	08	71	30.42
75 17 21 E 33 03 58 N	26	12	-	-	-
75 21 22 E 33 04 09 N	26	02	05	-	-
75 21 07 E 33 03 19 N	26	01	05	45	78.13
		Map sheet No. 43 P/1			
75 11 19 E 32 46 11 N	26	03	20	13	4.83
75 11 08 E 32 46 17 N	26	02	06	15	7.15

Contents

1	2	3	4	5	6
75 14 10 E 32 45 16 N	26	01	06	08	21.71
75 13 17 E 32 47 12 N	26	02	20	33	3.70
75 07 29 E 32 48 53 N	26	15	-	-	-
75 09 54 E 32 48 34 N	26	03	20	12	0.78
75 10 12 E 32 48 35 N	26	03	20	05	0.82
75 03 43 E 32 51 43 N	26	02	06	22	15.46
75 14 02 E 32 52 02 N	26	02	06	18	23.30
75 01 37 E 32 53 12 N	26	02	06	11	8.30
75 04 12 E 32 52 33 N	26	03	06	04	6.96
75 12 15 E 32 54 13 N	26	02	06	29	5.30
75 00 15 E 32 56 15 N	26	02	06	-	-
75 07 43 E 32 56 15 N	26	12	-	-	-
75 11 08 E 32 55 55 N	26	13	-	-	-
75 11 21 E 32 56 35 N	26	02	06	19	2.03
75 14 42 E 32 56 19 N	26	02	06	34	16.71
75 12 44 E 32 56 09 N	26	02	06	-	-
75 04 39 E 32 58 38 N	26	13	-	-	-
75 05 32 E 32 59 09 N	26	02	06	-	-
75 09 17 E 32 58 01 N	26	03	08	05	5.08
75 08 11 E 32 59 29 N	26	02	06	09	9.73
75 10 52 E 32 59 01 N	26	03	20	05	4.41
75 14 25 E 32 59 00 N	26	13	-	-	-
75 12 59 E 32 58 30 N	26	02	06	82	12.72

Contents

1	2	3	4	5	6
		Map sheet No. 43 P/2			
75 13 09 E 32 39 45 N	26	03	20	03	0.17
75 13 00 E 32 44 21 N	26	02	20	16	1.34
		Map sheet No. 43 P/5			
75 17 26 E 32 58 58 N	26	03	01	03	36.57
75 15 02 E 32 58 31 N	26	02	09	49	3.45
75 17 34 E 32 58 28 N	26	17	-	-	-
75 19 57 E 32 59 01 N	26	12	-	-	-
75 22 11 E 32 59 11 N	26	02	09	42	26.26
75 26 17 E 32 57 45 N	26	02	08	66	26.34
75 15 52 E 32 56 02 N	26	02	06	18	7.77
75 16 35 E 32 56 28 N	26	02	09	36	3.99
75 20 57 E 32 56 51 N	26	02	04	07	14.02
75 21 29 E 32 55 36 N	26	02	04	22	64.98
75 23 12 E 32 55 53 N	26	12	-	-	-
75 27 05 E 32 56 25 N	26	01	07	54	34.19
75 27 47 E 32 56 57 N	26	02	-	-	-
75 29 43 E 32 55 33 N	26	02	03	11	40.23
75 16 20 E 32 53 29 N	26	03	06	13	7.03
75 16 09 E 32 18 58 N	26	03	06	09	10.63
75 21 44 E 32 54 11 N	26	02	09	50	6.32
75 20 40 E 32 53 21 N	26	02	06	01	3.26
75 24 50 E 32 54 24 N	26	02	08	39	2.82
75 25 58 E 32 52 30 N	26	02	02	29	52.45
75 28 21 E 32 54 20 N	26	02	05	-	-

Contents

1	2	3	4	5	6
75 29 04 E 32 53 10 N	26	01	05	03	10.19
75 22 02 E 32 51 55 N	26	02	06	15	17.98
75 23 50 E 32 52 17 N	26	02	09	43	10.42
75 26 09 E 32 51 05 N	26	02	09	72	32.50
75 26 17 E 32 51 27 N	26	02	02	20	43.04
75 27 28 E 32 51 14 N	26	03	03	-	-
75 25 14 E 32 48 39 N	26	02	08	-	-
75 27 13 E 32 48 46 N	05	02	09	10	17.43
75 22 34 E 32 45 15 N	26	02	08	12	3.19
75 26 32 E 32 47 18 N	05	01	09	52	14.68
75 28 07 E 32 46 59 N	05	01	06	-	-
75 29 20 E 32 45 29 N	05	02	08	40	11.79
		Map sheet No. 43 P/6			
75 18 11 E 32 41 42 N	12	02	08	-	-
75 20 19 E 32 42 00 N	12	02	06	17	10.98
75 25 17 E 32 41 55 N	05	02	06	17	8.94
75 28 18 E 32 41 37 N	05	02	20	-	-
75 16 20 E 32 43 55 N	26	02	06	28	17.84
75 18 51 E 32 42 36 N	26	02	06	27	7.56
75 20 25 E 32 44 19 N	26	13	-	-	-
75 22 02 E 32 43 11 N	05	02	06	16	9.19
75 23 40 E 32 43 05 N	05	02	06	35	13.16
75 23 49 E 32 44 24 N	05	13	-	-	-
75 27 15 E 32 43 21 N	05	02	06	62	13.28

Contents

1	2	3	4	5	6
75 25 15 E 32 44 07 N	05	02	09	70	20.03
75 28 16 E 32 43 07 N	05	02	08	21	2.30
75 29 16 E 32 44 21 N	05	02	06	-	-
75 22 59 E 32 42 24 N	05	02	06	12	8.30
		Map sheet No 43 P/9			
75 37 34 E 32 46 52 N	05	02	02	27	22.88
75 31 50 E 32 46 28 N	05	02	02	16	16.00
75 33 44 E 32 46 53 N	05	01	05	30	22.99
75 35 10 E 32 45 49 N	05	03	01	03	18.35
75 37 20 E 32 46 41 N	05	02	02	17	31.16
75 34 42 E 32 49 21 N	05	02	02	13	26.82
75 35 17 E 32 49 07 N	05	02	05	12	11.93
75 37 14 E 32 48 22 N	05	02	02	35	18.79
75 38 35 E 32 49 26 N	05	01	08	-	-
75 38 55 E 32 48 03 N	05	01	02	39	46.77
75 32 14 E 32 50 51 N	05	12	-	-	-
75 30 15 E 32 51 40 N	26	01	05	20	37.05
75 33 50 E 32 52 08 N	26	01	02	21	54.80
75 37 22 E 32 50 37 N	05	01	-	-	-
75 35 07 E 32 51 52 N	26	02	-	-	-
75 39 10 E 32 50 29 N	05	11	-	-	-
75 30 26 E 32 53 02 N	26	01	05	23	62.11
75 32 02 E 32 54 19 N	26	02	02	-	-
75 33 40 E 32 53 29 N	26	02	02	-	-

Contents

1	2	3	4	5	6
75 36 52 E 32 53 52 N	26	02	03	-	-
75 35 38 E 32 53 40 N	26	01	-	-	-
75 38 14 E 32 54 52 N	26	03	08	-	-
75 31 53 E 32 55 51 N	26	02	09	21	29.20
75 30 35 E 32 56 41 N	26	02	03	-	-
75 33 05 E 32 55 24 N	26	01	03	27	101.88
75 39 12 E 32 55 05 N	26	03	09	-	-
		Map sheet No. 43 P/6			
75 16 11 E 32 43 37 N	26	02	06	-	-

Total:- 253 Points.

Contents

District : JAMMU

Map sheet coverage : 43 K/8,12 43 L/5,9,13,14, 43 P/1,2,6 (9 sheets)

Longitude E & Latitude N of plot centre			Forest Division code	Land use code	Forest type code	No of trees enumerated in the sample plot of .1 ha.	Vol (m^3) in sample plot of .1 ha.
Degree	Minute	Second					
1			2	3	4	5	6
				Map sheet No. 43 P/1			
75 32	00 47	45 E 10 N	08	02	06	17	9.92
75 32	03 45	20 E 03 N	08	02	06	12	10.03
				Map sheet No. 43 P/2			
75 32	11 34	05 E 02 N	08	03	06	-	-
75 32	04 35	17 E 50 N	08	04	-	-	-
75 32	09 35	52 E 35 N	08	04	-	-	-
75 32	07 36	41 E 49 N	08	03	20	-	-
75 32	13 35	32 E 07 N	12	02	08	08	0.94
75 32	01 39	29 E 12 N	08	02	06	07	2.26
75 32	01 38	00 E 16 N	08	03	17	-	-
75 32	00 41	07 E 30 N	08	03	06	05	0.38
75 32	03 40	59 E 20 N	08	03	20	-	-
75 32	03 42	30 E 10 N	08	02	06	40	9.67
75 32	00 43	50 E 41 N	08	03	06	03	3.43
75 32	01 43	42 E 49 N	08	03	06	07	2.80
75 32	02 43	47 E 14 N	08	13	-	-	-
75 32	04 44	26 E 07 N	08	02	06	09	56.02*
75 32	05 43	32 E 15 N	08	02	-	-	-

* This abnormally high volume is due to occurence of a single tree having 188 cms DBHOB in the pl

Contents

1	2	3	4	5	6
		Map sheet No. 43 P/6			
75 19 36 E 32 35 29 N	12	02	06	02	3.42
75 20 40 E 32 35 49 N	12	03	20	-	-
		Map sheet No. 43 L/5			
74 29 24 E 33 05 25 N	08	03	20	11	0.50
74 28 12 E 33 07 07 N	08	03	17	10	0.69
74 27 26 E 33 11 28 N	08	03	-	-	-
74 29 02 E 33 12 22 N	08	03	08	12	2.06
74 28 19 E 33 10 08 N	08	11	-	-	-
74 29 13 E 33 14 28 N	08	02	06	07	8.05
74 28 16 E 33 12 58 N	08	11	-	-	-
	Map sheet No. 43 L/9				
74 38 42 E 32 47 09 N	08	12	-	-	-
74 34 18 E 32 54 57 N	08	03	06	01	2.13
74 38 49 E 32 54 37 N	08	03	20	-	-
74 31 43 E 32 57 01 N	08	02	06	26	14.65
74 34 00 E 32 55 24 N	08	03	06	03	1.87
74 33 31 E 32 57 11 N	08	02	06	08	10.69
74 36 51 E 32 57 26 N	08	02	06	06	14.06
74 38 37 E 32 55 25 N	08	03	20	01	0.04
74 40 10 E 32 56 28 N	08	03	20	-	-
74 31 08 E 32 57 37 N	08	03	20	08	0.70
74 31 26 E 32 59 58 N	08	12	-	-	-
74 33 55 E 32 58 33 N	08	03	20	-	-
74 33 34 E 32 58 56 N	08	11	-	-	-

Contents

1	2	3	4	5	6
74 35 38 E 32 58 24 N	08	02	06	02	2.33
74 36 52 E 32 59 07 N	08	02	06	09	11.55
74 39 05 E 32 59 24 N	08	02	-	-	-
74 38 22 E 32 58 05 N	08	13	-	-	-
74 41 58 E 32 59 55 N	08	13	-	-	-
74 43 54 E 32 59 22 N	08	03	20	-	-
	Map sheet No. 43 L/13				
74 51 34 E 32 46 39 N	08	03	20	09	0.84
74 52 57 E 32 47 11 N	08	03	20	18	1.05
74 52 36 E 32 49 37 N	08	03	06	22	6.92
74 52 36 E 32 48 58 N	08	03	06	-	-
74 53 05 E 32 51 10 N	08	03	06	-	-
74 57 05 E 32 52 18 N	08	02	08	14	1.37
74 51 11 E 32 52 50 N	08	03	-	-	-
74 51 14 E 32 54 46 N	08	02	06	04	8.26
74 55 44 E 32 53 15 N	08	02	06	21	12.80
74 51 27 E 32 55 45 N	08	02	06	06	14.95
	Map sheet No. 43 L/14				
45 52 37 E 32 44 11 N	08	13	-	-	-
45 54 48 E 32 43 21 N	08	03	20	02	0.20
	Map sheet No. 43 K/8				
74 26 52 E 33 00 05 N	08	03	06	07	14.62
74 28 22 E 33 00 18 N	08	13	-	-	-
	Map sheet No. 43 K/12				
74 30 23 E 33 00 40 N	08	01	06	13	22.76
74 35 14 E 33 00 39 N	08	03	06	03	7.70

Contents

1			2	3	4	5	6
74	39	29 E	08	03	-	-	-
33	00	15 N					
74	40	27 E	08	03	06	-	-
33	01	10 N					
74	42	05 E	08	13	-	-	-
33	01	20 N					

Total:- 64 points.

Contents

District : Kathua

Map sheet coverage : 43 P/2,6,7,9,10,11,13,14 = 8 sheets.

Longitude E Latitude N of plot centre			Forest Division code	Land use code	Forest type code	No. of trees enumerated in sample plot of 0.1 ha.	Vol (m^3) in sample plot of 0.1 ha.
Degree	Minute	Second					
1			2	3	4	5	6
			Map sheet No. 43 P/6				
75 32	17 31	21 E 39 N	12	13	-	-	-
75 32	24 30	33 E 36 N	12	03	17	22	1.44
75 32	21 33	52 E 56 N	12	03	30	03	0.17
75 32	20 33	38 E 35 N	12	03	20	-	-
75 32	22 34	52 E 47 N	12	03	20	-	-
75 32	26 34	02 E 22 N	12	03	08	-	-
75 32	28 33	05 E 50 N	12	04	-	-	-
75 32	21 36	52 E 39 N	12	02	06	10	12.42
75 32	23 35	55 E 24 N	12	02	06	30	10.89
75 32	26 35	15 E 34 N	05	02	06	16	28.35
75 32	17 38	43 E 25 N	05	02	06	08	5.62
75 32	29 40	13 E 54 N	05	03	20	33	3.77
			Map sheet No. 43 P/2				
75 32	11 33	22 E 27 N	12	04	-	-	-
75 32	13 33	23 E 35 N	12	03	20	07	0.55
75 32	14 33	11 E 53 N	12	02	06	08	5.34
			Map sheet No. 43 P/7				
75 32	21 29	07 E 44 N	12	03	20	08	1.01

Contents

1			2	3	4	5	6
75	24	38 E	12	01	20	-	-
32	29	19 N					
75	28	41 E	12	02	20	12	0.07
32	27	56 N					
75	28	52 E	12	02	20	32	3.14
32	29	33 N					
			Map sheet No. 43P/9				
75	30	38 E	12	01	05	54	22-14
32	46	04 N					
75	39	57 E	05	03	02	30	47.07
32	45	35 N					
75	41	41 E	05	02	-	-	-
32	47	07 N					
75	44	42 E	05	01	09	-	-
32	45	11 N					
75	42	43 E	05	11	-	-	-
32	49	28 N					
75	44	46 E	05	02	03	17	3.47
32	48	04 N					
75	44	38 E	05	03	09	-	-
32	50	48 N					
			Map sheet No. 43P/10				
75	31	39 E	12	03	06	13	7.70
32	30	47 N					
75	34	04 E	12	03	17	19	8.85
32	30	24 N					
75	33	25 E	12	13	-	-	-
32	32	06 N					
75	36	39 E	05	03	06	05	6.63
32	32	06 N					
75	35	50 E	12	13	-	-	-
32	33	24 N					
75	38	07 E	05	02	08	36	7.42
32	30	58 N					
75	38	06 E	05	02	06	07	12-92
32	32	39 N					
75	41	51 E	05	03	06	11	4.59
32	34	14 N					
75	44	28 E	05	02	06	13	6.63
32	34	05 N					
75	36	39 E	05	03	20	17	1.17
32	37	09 N					
75	40	29 E	05	03	09	-	-
32	36	11 N					
75	43	56 E	05	[illegible]	-	-	-
32	35	02 N					

Contents

1	2	3	4	5	6
75 43 34 E 32 37 29 N	05	02	06	19	14.86
75 37 02 E 32 39 16 N	05	02	06	07	6.13
75 39 16 E 32 39 58 N	05	03	06	10	4.85
75 41 18 E 32 37 41 N	05	02	06	17	13.88
75 43 57 E 32 39 44 N	05	11	-	-	-
75 43 35 E 32 37 45 N	05	03	06	08	6.75
75 30 40 E 32 41 45 N	05	02	06	22	21.58
75 32 38 E 32 41 36 N	05	01	06	43	15.94
75 34 53 E 32 40 53 N	05	02	06	16	8.46
75 35 54 E 32 42 16 N	05	12	-	-	-
75 37 59 E 32 40 44 N	05	01	09	69	34.54
75 44 26 E 32 42 08 N	05	12	-	-	-
75 31 18 E 32 42 42 N	05	03	06	24	3.47
75 34 09 E 32 44 43 N	05	11	-	-	-
75 35 39 E 32 42 54 N	05	01	09	89	24.19
75 38 50 E 32 43 24 N	05	03	09	01	0.12
75 41 39 E 32 43 38 N	05	02	-	-	-
75 43 57 E 32 44 31 N	05	03	09	-	-
	M..o sheet No.43 P/11				
75 37 34 E 32 24 44 N	12	11	-	-	-
75 40 43 E 32 24 54 N	12	02	17	20	0.84
75 31 43 E 32 27 19 N	12	02	08	20	2.55

Contents

1	2	3	4	5	6
75 34 24 E 32 26 51 N	12	13	-	-	-
75 37 04 E 32 25 02 N	12	02	20	17	1.65
75 39 45 E 32 26 27 N	12	03	17	16	1.09
75 42 12 E 32 27 03 N	12	11	-	-	-
75 43 24 E 32 25 27 N	12	03	17	12	1.16
75 34 11 E 32 29 31 N	12	03	-	-	-
75 35 12 E 32 28 48 N	12	03	20	-	-
75 38 57 E 32 29 46 N	12	03	08	13	2.58
75 38 32 E 32 27 41 N	12	03	20	16	2.30
75 42 14 E 32 29 25 N	05	02	20	19	1.67
75 40 18 E 32 28 02 N	12	02	-	-	-
75 44 59 E 32 29 42 N	05	03	20	-	-
75 42 36 E 32 27 45 N	05	03	08	07	3.15
	Map sheet No.43 P/13				
75 46 11 E 32 46 09 N	05	01	-	-	-
75 46 18 E 32 46 21 N	05	01	09	74	26.28
75 49 04 E 32 45 20 N	05	12	-	-	-
75 52 23 E 32 45 15 N	05	17	-	-	-
75 50 05 E 32 47 14 N	05	01	05	44	53.82
75 52 32 E 32 46 08 N	05	11	-	-	-
75 46 07 E 32 48 14 N	05	01	05	38	153.75

Contents

1	2	3	4	5	6
75 46 23 E 32 49 16 N	05	02	02	36	24.55
75 48 26 E 32 49 58 N	05	11	-	-	-
75 51 11 E 32 49 34 N	05	03	08	-	-
75 45 38 E 32 50 02 N	05	01	03	59	47.54
75 46 52 E 32 52 28 N	05	03	03	10	31.77
75 48 22 E 32 50 55 N	05	02	02	31	8.87
75 46 25 E 32 52 35 N	05	02	01	51	38.43
	Map Sheet No. 43 P/14				
75 47 40 E 32 34 20 N	05	02	06	20	14.54
75 49 49 E 32 33 09 N	05	03	20	13	0.88
75 45 04 E 32 35 25 N	05	02	06	04	7.59
75 52 44 E 32 35 15 N	05	03	20	-	-
75 48 28 E 32 38 30 N	05	12	-	-	-
75 49 01 E 32 39 00 N	05	11	-	-	-
75 50 54 E 32 37 50 N	05	11	-	-	-
75 51 36 E 32 39 39 N	05	02	06	-	-
75 53 07 E 32 38 51 N	05	02	-	-	-
75 46 46 E 32 41 55 N	05	04	-	-	-
75 47 55 E 32 42 22 N	05	01	,05	25	31.14
75 49 33 E 32 40 08 N	05	02	06	-	-
75 51 22 E 32 40 13 N	05	02	09	-	-
75 53 05 E 32 41 23 N	05	13	-	-	-
75 49 26 E 32 42 39 N	05	12	-	-	-
75 52 36 E 32 44 53 N	05	02	05	-	-

Contents

District : Rajouri

Map sheet coverage : 43 K/2,3,4,6,7,8,11,12 = 8 sheets.

Longitude E Latitude N of plot centre (Degree, Minute, Second)	Forest Division code	Land use code	Forest type code	No of trees enumerated in sample plot of 0.1 ha.	Vol. (m^3) in sample plot of 0.1 ha.
1	2	3	4	5	6
Map sheet No. 43 K/2					
74 12 45 E 33 32 21 N	22	03	09	13	0.48
Map sheet No. 43 K/3					
74 14 50 E 33 16 23 N	22	04	20	01	1.20
74 11 48 E 33 19 16 N	22	02	06	04	6.28
74 13 41 E 33 19 13 N	22	03	06	07	4.31
74 11 03 E 33 20 25 N	22	12	-	-	-
74 12 39 E 33 21 35 N	22	12	-	-	-
74 14 50 E 33 20 51 N	22	03	06	04	12.38
74 14 23 E 33 22 51 N	22	02	06	12	16.83
74 13 06 E 33 24 34 N	22	12	-	-	-
74 13 08 E 33 25 45 N	22	03	08	15	9.41
Map sheet No. 43 K/4					
74 14 16 E 33 07 42 N	22	02	06	07	14.54
74 08 14 E 33 10 21 N	22	02	06	09	8.96
74 09 08 E 33 12 09 N	22	02	06	08	10.58
74 13 24 E 33 11 18 N	22	02	06	03	5.42
74 14 07 E 33 11 10 N	22	02	06	12	11.41
74 04 56 E 33 14 23 N	22	02	-	-	

Contents

1	2	3	4	5	6
74 07 00 E 33 12 40 N	22	02	06	07	11.48
74 09 25 E 33 14 24 N	22	02	06	04	11.52
74 08 02 E 33 13 03 N	22	03	06	04	2.51
74 11 38 E 33 14 23 N	22	02	06	04	3.28
74 14 08 E 33 14 14 N	22	02	06	34	13.44
74 13 17 E 33 13 19 N	22	12	-	-	-
	Map sheet No. 43 K/6				
74 16 20 E 33 32 06 N	22	01	06	10	20.05
74 22 00 E 33 30 25 N	22	03	09	04	3.40
74 25 28 E 33 31 21 N	22	03	09	09	1.07
74 27 03 E 33 31 08 N	22	03	01	00	-
74 18 47 E 33 33 24 N	22	01	09	-	-
74 21 52 E 33 33 52 N	22	04	-	-	-
74 26 27 E 33 32 47 N	22	02	-	-	-
	Map sheet No. 43 K/7				
74 17 27 E 33 15 34 N	22	03	06	07	13.22
74 23 26 E 33 15 38 N	22	02	08	14	17.61
74 25 56 E 33 15 16 N	22	03	20	29	2.19
74 27 42 E 33 15 16 N	22	02	06	14	10.07
74 29 48 E 33 17 13 N	22	03	-	-	-
74 16 30 E 33 17 54 N	22	02	06	07	10.52
74 27 13 E 33 18 28 N	22	02	06	04	6.79
74 28 39 E 33 17 42 N	22	03	08	34	6.54
74 16 13 E 33 22 23 N	22	03	06	06	11.14

Contents

1	2	3	4	5	6
74 24 26 E 33 21 12 N	22	02	06	11	20.73
74 29 19 E 33 21 26 N	22	01	09	43	25.54
74 27 53 E 33 21 26 N	22	02	06	06	25.89
74 27 54 E 33 23 54 N	22	02	09	73	7.22
74 17 47 E 33 26 47 N	22	03	06	17	2.30
74 29 57 E 33 26 47 N	22	01	-	-	-
74 17 13 E 33 29 20 N	22	02	06	14	15.01
74 17 53 E 33 28 55 N	22	03	06	04	1.27
74 23 15 E 33 29 29 N	22	03	09	00	-
74 27 02 E 33 28 05 N	22	01	-	-	-
74 28 09 E 33 29 25 N	22	03	01	06	0.42
74 29 22 E 33 28 04 N	22	01	-	-	-
	Map sheet No. 43 K/8				
74 21 28 E 33 01 00 N	22	03	06	06	2.47
74 24 18 E 33 00 44 N	22	03	20	14	0.76
74 23 08 E 33 00 44 N	22	03	-	-	-
74 29 25 E 33 06 08 N	22	03	17	08	1.92
74 20 58 E 33 08 54 N	22	02	06	15	6.08
74 24 37 E 33 09 53 N	22	02	06	06	11.31
74 26 23 E 33 08 11 N	22	03	06	07	0.68
74 27 31 E 33 08 42 N	22	02	06	09	16.45
74 16 11 E 33 10 55 N	22	03	06	11	10.63
74 19 47 E 33 12 25 N	22	03	08	09	0.76
74 17 44 E 33 10 05 N	22	03	20	11	2.13

Contents

1	2	3	4	5	6
74 21 52 E 33 10 42 N	22	02	06	08	11.20
74 20 38 E 33 11 45 N	22	01	06	27	12.90
74 25 44 E 33 10 10 N	22	03	06	40	17.38
74 29 47 E 33 10 51 N	22	02	06	09	13.83
74 16 53 E 33 14 32 N	22	03	06	12	10.49
74 18 14 E 33 13 08 N	22	03	06	19	6.21
74 19 14 E 33 14 23 N	22	03	06	04	12.59
	Map sheet No. 43 K/11				
74 34 33 E 33 15 08 N	22	01	08	45	19.19
74 37 47 E 33 16 08 N	22	02	09	27	7.72
74 40 25 E 33 15 19 N	25	03	20	20	5.63
74 31 21 E 33 19 23 N	22	01	09	31	17.79
74 33 25 E 33 17 58 N	22	01	09	42	26.10
74 35 25 E 33 19 42 N	22	01	09	15	11.14
74 38 35 E 33 17 55 N	22	03	09	01	0.04
74 30 29 E 33 20 26 N	22	02	08	26	9.27
74 34 33 E 33 20 47 N	22	02	09	29	3.47
74 35 25 E 33 20 33 N	22	03	09	00	0.0
74 38 31 E 33 20 28 N	22	02	09	25	10.27
74 32 00 E 33 24 08 N	22	01	09	77	5.30
74 33 32 E 33 24 54 N	22	02	01	08	25.45
74 33 58 E 33 22 38 N	22	02	09	54	6.99
74 37 09 E 33 22 43 N	22	02	09	24	8.67
74 35 19 E 33 24 45 N	22	01	01	–	–

Contents

1				2	3	4	5	6
74	38	02	E	22	03	09	03	2.07
33	23	56	N					
74	30	48	E	22	01	01	25	22.81
33	25	45	N					
74	31	40	E	22	02	-	-	-
33	26	44	N					
74	33	44	E	22	01	01	-	-
33	25	39	N					
74	33	47	E	22	02	01	07	53.90
33	26	51	N					
74	37	17	E	22	03	01	-	-
33	25	33	N					
74	35	12	E	22	03	-	-	-
33	26	57	N					
74	39	22	E	22	02	09	-	-
33	26	05	N					
74	33	08	E	22	02	-	-	-
33	28	14	N					
				Map sheet No. 43K/12				
74	32	07	E	22	01	06	11	15.91
33	01	49	N					
74	30	29	E	22	02	06	09	3.92
33	07	13	N					
74	31	58	E	22	01	06	23	22.90
33	05	16	N					
74	32	30	E	22	03	06	04	7.77
33	05	11	N					
74	35	48	E	22	03	06	06	3.61
33	05	31	N					
74	34	29	E	22	02	08	31	3.86
33	07	54	N					
74	30	46	E	22	01	06	10	12.46
33	13	26	N					
74	31	46	E	22	01	06	21	12.24
33	14	02	N					
74	36	10	E	22	01	20	83	13.97
33	14	10	N					
74	39	16	E	25	01	09	82	12.78
33	14	24	N					
74	32	34	E	08	02	06	02	3.08
33	01	02	N					

Total:- 104 points.

Contents

Description of codes for Forest Division in col.2 of appendix II

Code	Name of Forest Division
01	Anantnag
02	Bhaderwah
03	Baramula
04	Bandipore.
05	Billawar
06	Batote
07	Doda
08	Jammu
09	Kahmil
10	Kamraj
11	Kargil
12	Kathua
13	Kishtwar
14	Leh
15	Lidder
16	Langet
17	Mohar
18	Marwah
19.	Poonch
20.	Pir Panjal
21	Ramban
22	Rajouri
23	Sindh
24	Shopia
25	Reasi
26	Udhampur

Contents

Description of codes for Land use in col. 3 of appendix

Code	Item	Description
01	Dense tree forest	All lands with a forest cover of trees with canopy density 70% and above (Canopy density is defined as the relative completeness of Canopy expre as percentage taking closed canopy as 100. Standing in a plot or in area around it observe the tree growth and assess the percentage of the space covered.)
02	Moderately Dense-tree forest	All lands with a forest cove of trees with canopy density 30% to 69%.
03	Open tree forest	All lands with a forest cove of trees with canopy density 5% to 29%.
04	Scrub forest	Inferior tree growth chi-fly of small or stunted trees. With canopy density less tha 5%.
05	Bamboo brakes	Areas completely covered wi bamboo growth.
06	Shifting cultivation (Kumri)	Areas under current as well a last years shifting cultivat will come under this class. agricultural crop may be stan g or may have been harvest.
07	Young plantations of forestry species	This will include young plant ions of forestry species in which average stems are of an above 10 cms. diameter at B and the extent of such plant ons is more than 0.5 ha. This will include farm forests, social forestry plantations, conversion to uniform areas, plantations raised by Forest Development Corporation etc.
08	Trees in line	This will include trees plan along canal banks, along road sides, along railway lines, wind brakes and shelter belts planted under various Social Forestry Schemes.

Contents

Code	Item	Description
09	Forest roads etc.	This class will include areas under forest roads, depots, colonies, nurseries and such other forest land used in connection with forest and its administration.
10	Govt. grass lands	This will include areas under natural or planted grass lands pastures etc. which are owned by Government.
11	Barren lands	This will include areas with exposed surfaces like rock she sand dunes, swamps and areas without any vegetation.
12	Agricultural land without trees in surround	All lands under cultivation including fallow lands will come under this category. The lands will not have any tree growth along bunds or in thei vicinity of 2 ha.
13	Agricultural lands with trees in surround	This will include all lands u cultivation including fallow lands which are covered with trees along bunds and in thei surround within 2 ha.
14	Non-forestry Plantations	All lands with tree growth planted primarily for purpose other than forestry such as Cashew, Coffee, gardens, park zoos, private grass lands etc.
15	Habitation	This will include village-Cit sites, industrial areas, grav yards, grounds, houses, colon etc.
16	Water bodies	Land under lakes, water court etc.
17	Other lands	Lands which cannot be classed under any of the above catego es.

Contents

Description of codes for Forest type i.e. col 4 of appendix II

Code	Crop composition (Forest type)	Description
01	Fir	When Fir constitute more than 50%
02	Spruce	Where Spruce constitute more than 50%
03	Fir-Spruce	Where Fir & Spruce both taken together constitute more than 50%
04	Blue-pine (Kail)	Where blue pine constitute more than 50%
05	Deodar	Where Deodar constitute more than 50%
06	Chir-pine	Where Chir-pine constitute more than 50%
07	Mixed conifers	Where all conifers taken together constitute more than 50%
08	Hardwoods mixed with conifers or Conifers mixed with Hardwood	Where the conifers & broad leaved species occur in more or less in same propositions.
09	Upland hardwoods	Broad leaved species constitute more than 50% in the Upper Chir zone above 1500 metre altitude.
10.	Teak	Where Teak constitute more than 50%
11.	Sal	Where Sal constitute more than 20% (If sal & Teak are both more than 20% preference to be given to Teak).
12.	Bamboo forest	Where the crop is of almost pure bamboo.
13.	Mangrove	Mangrove forests.
14.	Depterocarpus (Gurjan)	Where Gurjan constitute more than 50% in the top canopy.
15.	Hollong Mekai Hollong (Depterocarpus macrocarpus Shorea assamica (Mekai)	Where Hollong & Mekai individual or both taken together constitute more than 50%
16.	Khasi pine	Where Khasi pine constitute more than 50%
17.	Khair forest	Where Khair trees constitute more than 50%
18.	Salai forest	Where Salai constitute more than 50%
19.	Alpine pastures	Alpine pastures.
20.	Miscellaneous forests	Forests which could not iified in any of the above

Contents

APPENDIX III

(Field Forms)

Contents

PLOT APPROACH FORM

1) Plot Approach Form must be filled in while the journey is in progress.
2) While recording date, it is essential to record month and year also.
3) If a plot is visited on more than one day, a separate form for each visit shall be filled up.

1. State and Code

2. Division and Code

3. District and Code

4. Map-sheet and Code

5. Grid Code
5. (a) Plot No.

6. Crew Leader (name)

7. Name of Camp

8. Time (hrs.) at which Left the camp

9. Distance covered by vehicle (km.)

10. Time taken in journey by vehicle Hours Minutes

11. Name of the place up to which journey was performed by vehicle. (describe in brief)

12. Conspicuous features observed during the journey by vehicle (describe in brief)

13. Time at which started on foot

14. Direction and distance covered on foot up to the reference point (km)

15. Conspicuous features observed during the journey on foot (describe in brief)

16. Time (hrs.) at which arrived at the reference point.

17. Description of the reference point (Describe in details)

18. Compass bearing from reference point to the plot approached for commencing survey (please give the Plot No. also) if any

19. Distance of the plot Centre from reference point (Mtr)

Contents

20.	Date and time at which arrived at the Plot	Ist Plot*	2nd Plot*
21.	Time (hrs) of Leaving the Plot	Ist Plot*	2nd Plot*
22.	Time (hrs.) at which returned to the Camp.		
23.	Compassing done by		
24.	Distance measured by		
25.	Plots laid out by		
26.	Tree Enumeration done by		
27.	Height measurements taken by		
28.	B T and other measurements taken by		
29.	Bamboo enumeration done by		
30.	Bamboo Weight taken by		
31.	References in the field written by		
32.	Remarks		

Dated :

Signature of the Crew Leader

Diagrams etc.

A B

N. B. *Strike out unwanted one.

Contents

PLOT DESCRIPTION FORM

Field Form 2

Job No.	Card design.	Zone	State	District	Forest Division	Map Sheet No.	Gird No.	Plot No.	Legal Status	Land Use
1—3	4—5	6	7—8	9—10	11—12	13—18	19—22	23	24	25—26

Terrain Data				Soil Data								Crop Data												Bamboo Data														
General Topography	SLOPE	Position on Slope	Altitude	Aspect	Rockiness	Humus	Soil Colour	Soil Consistency	Soil Texture	Coarse Fragments	Soil Depth	Soil Erosion	Origin of Stand	Crop. Composition	Canopy Layer or Storey	Top Height	Size Class	Intensity of regeneration	Important Species under registration	Injuries to Crop	Fire Incidence	Grazing Incidence	Presence of weeds	Presence of Grass	Bamboo density	Bamboo quality	Bamboo Flowering	Bamboo regeneration	Plantation Potential	Distance to road	Distance to Mule Path	Distance to River/stream	Kacha road Distance	Pucca road Distance	River distance to market outlet	Obstacles	Plot Status	Status of Forest
27	28-30	31	32 35	36	37	38	39	40	41	42	43	44	45	46-47	48-49	50 51	52	53	54-56	57	58	59	60	61	62	63	64	65	66	67	68	69	70 71	72 74	75 76	77	78	79

Signature of Crew Leader.....

Name of crew Leader

Contents

Field Form No..3

PLOT ENUMERATION FORM

Job No.	Card design	Map Sheet No.	Grid No.	Plot No.
1—3	4 5	6—11	12—15	16

Total No. of bamboo clums	Total No. of trees
71—73	74—75

Species		Species		Species		Species		Species		Species		Species		Species		Species	
Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia
17-19	20-22	23-25	26-28	29-31	32-34	35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70

Date .. ..

Signature of Crew Leader..... ....

Name of Crew Leader ....

Contents

Field Form No. 4

SAMPLE TREE FORM

Job No.	Card design	Map Sheet No.	Grid No.	Plot No.
1—3	4—5	6—11	12—15	16

Total No. of trees
55—56

SPECIES	Tree Serial No.	Species Code	Dominance	DBH OB (cm)	DBT (mm)	Tree Height (m)	Clear Bole (m)	Condition	Form		SPECIES	Tree Serial No.	Species Code	Dominance	DBH OB (cm)	DBT (mm)	Tree Height (m)	Clear Bole (m)	Condition	Form	
									Longitudinal	Sectional										Longitudinal	Sectional
	17-18	19-21	22	23-25	26-28	29-30	31-32	33	34	35		36-37	38-40	41	42-44	45-47	48-49	50-51	52	53	54

Date.....

Signature of Crew Leader.....

Name of Crew Leader.....

Contents

Field Form 5

BAMBOO ENUMERATION AND CLUMP ANALYSIS FORM

Job No.	Card Design	Map Sheet No.	Grid No.	Plot No.
1—3	4-5	6—11	12—15	16

Average culm height (in dcm)		Bamboo quality
Up to 1cm. top dia 72—74	Upto 2cm top dia 75—77	78

Species	Species Code	Clump Serial No.	Clump diameter (in cms.)	Clump size class	Green sound culms							Green damaged culms							Dry sound culms			Dry damaged culms			Decayed culms	Total No. of culms
					Current year's	One to two seasons old			Over two seasons old			Current year's	One to two seasons old			Over two seasons old										
						2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms		2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms	2< Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms		
	17—19	20-22	23-25	26	27—28	29-30	31-32	33-34	35-36	37-38	39-40	41—42	43-44	45-46	47-48	49-50	51-52	53-54	55-56	57-58	59-60	61-62	63-64	65-66	67—68	69—71

Date.....

Signature of Crew Leader.....

Name of Crew Leader.....

Contents

BAMBOO ENUMERATION FORM (NON CLUMP FORMING)

Field Form 6

Job No.	Card Design	Map Sheet No.	Grid No.	plot No.
1—3	4—5	6—11	12—15	16

Species Code	Green sound culms							Green damaged culms							Dry sound culms			Dry damaged culms			Decayed culms	Average culms Ht. (in decimeter)	Total No. of culms
	Current year's	One to two years old			Over two years old			Current year's	One to two year old			Over two years old											
		2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms		2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms			
17—19	20—22	23—25	26—28	29-30	31-33	34-36	37-38	39-41	42-44	45-47	48-49	50-52	53-55	56-57	58-60	61-62	63-64	65—67	68-69	70-71	72-73	74-76	77-80

Date .....

Signature of Crew Leader.....

Name of the Crew Leader.....

Contents

BAMBOO WEIGHT FORM

Field Form No. 7

Job Number	Card Design
1—3	4—5

Map Sheet Number	Grid No.	Plot Number
6—11	12—15	16

| Species | Sample No. | Green Weight of culm — DIAMETER CLASS — 2 to under 5 cm | | | | | | | | | | | | | | | | | | | | 5 to under 8 cm | | | | | | | | | | | | | | | | | | 8 cm and ever | | | | | | | | | | | | | | | | | | Green weight of sub-sample for co-relation with dry weight | | | | | | | | | | | |
|---|---|---

HERBS AND SHRUBS DATA FORM

Field Form No. 8

Map Sheet No.....

Grid No.....

Plot No.....

HERBS								SHRUBS									
Name of Species	Total No.	Characteristics			Occurrence		Colour of flower if observed	Name of Spp	Total No.	Avr. Ht.	Pattern of Branching			Occurence		Information on flowers & Fruits	
		Erect	prostrate	Creeping	Grega-rious	Sporadic					Opposite	Alternate	Whorling	Grega-rious	Sporadic	Clour of Flowers	Size of fruit (Small med big)

Date.....

Signature of the Crew Leader.....

Name of the Crew Leader.....

Contents

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2. Forest Survey of India, Dehradun 1982 — The Manual of Instructions for Field Inventory.

3. Govt. of Jammu & Kashmir 1980-81 — Statistical hand books of Jammu District, Kathua District, Udhampur District, Rajouri District

Contents